HANDBOOK FOR ARIZONA COMMUNITIES

on Floodplain Management and the National Flood Insurance Program

Prepared by the Arizona Department of Water Resources

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On Floodplain Management and the National Flood Insurance Program

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Jane Dee Hull, GOVERNOR
State of Arizona

Rita Pearson Maguire, Director
Arizona Department of Water Resources

Arizona Department of Water Resources
500 North Third Street
Phoenix, Arizona 85004
(602) 417-2400
(800) 352-8488
(602) 417-2425 [TDD]
http://www.water.az.gov

Additional copies can be obtained by contacting
the Arizona Division of Emergency Management
5636 East McDowell Road
Phoenix, Arizona 85008
(602) 244-0504
http://www.dem.state.az.us

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The Handbook for Arizona Communities on Floodplain Management and the National Flood Insurance Program was prepared by the Arizona Department of Water Resources. This handbook is a summary on floodplain management and the National Flood Insurance Program and includes a compilation of public documents and sources. This handbook is provided as a reference and guide for communities participating in the National Flood Insurance Program. We would like to express our gratitude and appreciation to those who have contributed to this document.

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Additional copies of this document as well as questions or suggestions regarding improvements should be requested from to the Arizona Division of Emergency Management at (602) 244-0504.

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CHAPTER 1 - FLOODS AND FLOODPLAIN MANAGEMENT

1.1 Handbook Purpose and Organization

This handbook has been prepared to assist elected officials, local government officials, and all other affected Arizona citizens to understand the concepts of floodplain management; the roles and interactions of the various levels of government and others involved in floodplain management and the National Flood Insurance Program (NFIP). This handbook only addresses the minimum NFIP and Arizona Revised Statutes (A.R.S.) requirements. Some communities may have adopted more restrictive measures.

This handbook is organized into five chapters:

1. floodplain management concepts and progress of Arizona communities;
2. brief overview of floodplains and floodways
3. techniques and administrative processes for floodplain management at the local level;
4. requirements for constructing structures in Special Flood Hazard Areas; and
5. flood insurance and responsibilities of the lender and the community.

This handbook is published in a "loose leaf" form so it may be revised, updated and corrected as the national, state and local programs evolve, and as users of the handbook identify topics which should be added. This handbook is intended to be comprehensive, but may not cover each and every individual situation that may be encountered. When dealing with unusual conditions or difficult decisions, the NFIP State Coordinator can provide advice or special assistance. When necessary, the State can also seek opinions and interpretations from the Federal Emergency Management Agency (FEMA). If there are any questions or comments on this publication or any aspect of floodplain management or if this publication is needed in an alternate format, please contact:

The State Coordinator for the NFIP
Arizona Division of Emergency Management
5636 East McDowell Road
Phoenix, Arizona 85008-3495
(602) 244-0504

1.2 Background Information

Flooding occurs naturally as one part of the earth's hydrologic system. It is when this natural event is combined with the human tendency to live at the water's edge that the interaction of natural and social environments produces the potential for disaster. This potential has been realized repeatedly throughout history, and losses due to flooding continue to increase.

There have been many attempts to moderate the impact of flooding, with modern efforts dominated by structural flood control measures devised to reduce or eliminate the flood event or to protect areas from the effects of flooding. However, the continuing damage due to flooding and current awareness of the nature of flooding have led to a shift toward a more comprehensive range of flood damage reduction methods. Attention has turned from a reliance on dams, levees, and other flood control structures to one that includes nonstructural measures such as land and water resource management and techniques for floodproofing individual buildings.

The need for a more comprehensive approach to flood damage reduction is recognized and supported by the various government agencies with a role in management of water resources and mitigation of natural disasters.

Rising annual average flood losses are a national problem that needs to be addressed by all levels of government, a wide variety of professionals in the construction and development industries, floodplain property owners, and the general taxpayer who ultimately pays for disaster assistance.

FEMA and Congress have been struggling to find ways to decrease the cost of natural disasters. Flooding disasters are the most frequent and the most costly. Nationally, flood losses since 1969 have exceeded $8.6 billion. To reduce future losses, more emphasis is being placed on mitigation.

1.3 Floods, Floodplains, and the National Flood Insurance Program

Historically, floods have been documented as events of great importance to human activities. Residents recognized both the benefits and hazards associated with lands situated along rivers. Early settlements throughout the State are located within flood hazard areas in order for easy access to trade, transportation, water supply, and water power. In addition, these areas had fertile soils, making them prime agricultural lands. This pattern of development continued as communities expanded. In recent decades, development along waterways has been brought on by the aesthetic and recreational values of these sites.

The result has been an increasing level of damage and destruction caused by the natural forces of flooding on human development. As of July 8, 1999, of the 87 incorporated cities and towns and the 15 counties in Arizona, 94 have been determined to have significant flood hazard areas. The major storms between 1970 and 1998 have caused in excess of tens of (hundreds) millions of dollars in damages in Arizona, along with the trauma and heartache of thousands of flood victims. These figures do not include numerous small floods that cause hundreds of thousands of dollars in damages almost every year.

Figure 1: Flooding along the Arizona Canal at Scottsdale Road in Phoenix, June 1972

In most of the flood events since 1980, the actual flood was not the largest flood known to have occurred even in the last century: the 1980 flood on the Salt River in the Phoenix area was only two-thirds as great as one which occurred in 1891; several floods at least twice as great as the 1978 and 1980 floods on the Agua Fria occurred between 1900 and 1920; the 1980 flood on the Verde River was about the same as a flood in 1938. Even where recent floods were greater than previously known floods, these previous floods had given notice that wide areas are subject to flooding. A review of Appendix E of this Handbook, "A Chronology of Flood Events in Arizona, 1862-1993," will confirm this information in more detail.

There are three ways to reduce flood losses: 1) reduce the amount of floodwater in a stream; 2) contain the floodwater in a channel; and 3) locate uses that are susceptible to damage away from the flood hazard.

The first two approaches are structural measures. Structural measures, such as dams, levees, channelization, have usually been constructed with public money to protect and reduce flood damage to existing structures. These measures will continue to be used in the future, especially for protecting areas containing existing development.

The third approach is considered a nonstructural approach, and it requires property owners of floodprone areas to recognize a limitation on the type of uses best suited for their property. For example, steep land is generally not suitable for irrigated crops; land located far from transportation facilities is generally not suitable for heavy industry. Similarly, land that is subject to flooding may not be suitable for many types of development.

Figure 2: The September 1962 Flood at Campbell Avenue and 15th Street in Tucson

The U.S. Congress established the NFIP in 1968 due to the mounting flood losses and escalating costs to the general taxpayer. The intent of the NFIP was to mitigate future flood damage and to provide property owners with flood insurance protection. It enables property owners to purchase flood insurance at reasonable rates, and it assists communities by requiring that they adopt and administer local floodplain management measures aimed at protecting lives and new construction from future flooding. All communities that have the authority to adopt, administer, and enforce floodplain management regulations can participate in the NFIP. The NFIP and related regulations, which define responsibilities and requirements for both FEMA and each participating community, are set forth in the Code of Federal Regulations (CFR), Title 44, Chapter I, Parts 59-77.

In Arizona as well as nationwide, floodplain management is the responsibility of the local government entities that are also responsible for land use planning and the issuance of building permits. All communities participating in the NFIP are required to implement regulations in accordance with minimum NFIP and state standards.

Before entering the Emergency and Regular Phases of the NFIP, a community must, if it has not already done so, adopt and enforce floodplain management regulations that are aimed at reducing future flood losses and that meet the minimum standards of the NFIP.

1.4 The Emergency and Regular Programs of the National Flood Insurance Program

Communities that participate in the NFIP do so in two phases: 1) the Emergency Phase and 2) the Regular Phase. Figure 3 depicts the process that participating communities follow under the emergency phase and the regular phase of the program.

1.4.1 Emergency Phase of the NFIP

Under the Emergency Phase of the NFIP, FEMA issues Flood Hazard Boundary Maps (FHBMs) for floodprone communities. These FHBMs provide approximate delineations of areas subject to inundation by the base (100-year) flood. The base flood is the flood that has a 1-percent probability of being equaled or exceeded in any given year and has been adopted as a regulatory standard by Federal agencies, and most states, for use in the administration of floodplain management programs. In the NFIP, the area that is inundated by the base flood is also referred to as a Special Flood Hazard Area (SFHA).

The boundaries of SFHAs (referred as 100-year floodplain boundaries) that have been shown on FHBMs are based on one or more of the following: information about past floods, regional flood depth/drainage area relationships, floodplain maps published by other Federal agencies, and simplified hydrologic and hydraulic calculations. Detailed analyses and field surveys have generally not been performed for the preparation of a FHBM. As a result, the floodplain boundaries shown are considered approximate, and SFHAs are designated "Zone A."

In the Emergency Phase of NFIP, the maximum amount of flood insurance coverage available is $35,000 for a single family dwelling and $100,000 for a non-residential building. The contents coverage for a residential building is $10,000, and it is $100,000 for a non-residential building.

1.4.2 Regular Phase of the NFIP

After a FHBM has been printed and issued for a community, a Flood Insurance Study (FIS) is completed. A FIS is a detailed engineering study of the flood hazards in that community. The purpose of the FIS is to refine the 100-year floodplain boundaries shown on the FHBM and to develop new, detailed flood risk information. That information usually consists of the following: 1) base flood elevations (BFEs), which may be presented as water-surface elevations (usually referenced to the National Geodetic Vertical Datum of 1929 (NGVD) or average depths of flow in feet above the ground surface; 2) 10-, 50-, 100-, and 500-year flood water surface elevations; 3) floodway boundaries of the 100-year floodway; and 4) 100- and 500-year floodplain boundaries. For older studies, the results are presented on Flood Hazard Boundary Floodway Maps (FHBFM) and Flood Insurance Rate Maps. For more recent studies, the results are incorporated on Flood Insurance Rate Maps (FIRM).

The FIRM depicts 100- and 500-year floodplain boundaries, flood insurance risk zones, BFEs, and 100-year floodway boundaries. The FIS report describes the analyses performed for the FIS and provides tables and figures that present the study results.

The information presented on the FIRM and in the FIS report is usually the result of the detailed engineering analyses performed as part of an FIS. Those analyses include hydrologic analyses that yield flood discharge-frequency relationships and hydraulic analyses that yield computed flood elevations and depths. The hydrologic analyses usually involve the use of statistical analyses of recorded stream gage data, regional discharge-drainage area relationships, or rainfall-runoff models.

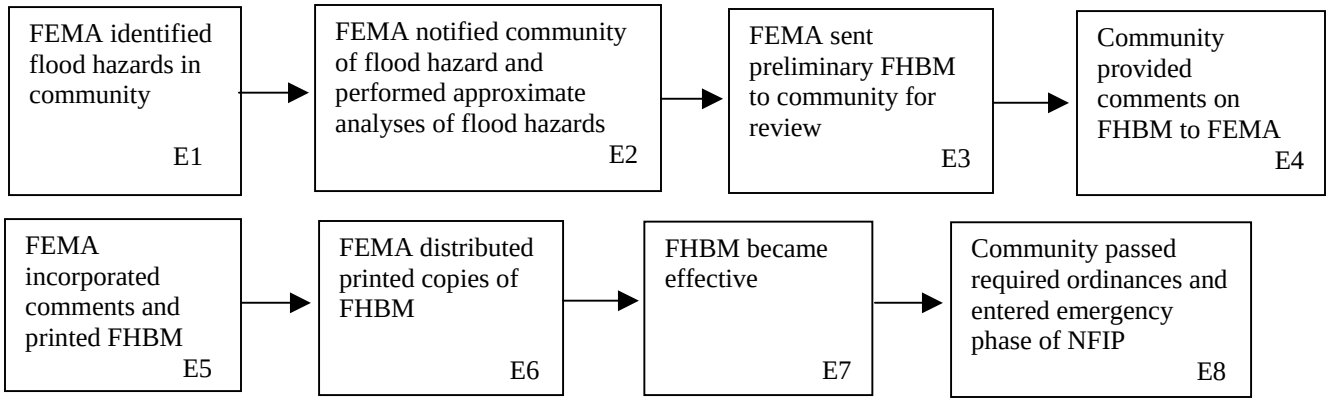
For riverine flooding sources, the hydraulic analyses usually involve backwater computations or other hydraulic computations that are based on the computed flood discharges and the results of field surveys. Special techniques are used for the analysis of coastal flooding and alluvial fan flooding.

SFHAs identified through the use of detailed engineering analyses are assigned "detailed" zone designations (Zone AO, Zone AH, Zones A1-A30 or Zone AE, and Zones V1-V30 or Zone VE). The FIRM may also depict approximate SFHAs (Zone A) developed by the FIS Contractor using approximate engineering analyses.

The 100- and 500- year floodplain and 100-year floodway boundaries may also be shown on a separate FBFM published as an exhibit in the FIS report. However, for most FISs initiated since January 1, 1985, FBFMs are not prepared, and all flood risk information, including the 100-year floodway, is shown on the FIRM.

There are no Arizona communities currently in the Emergency Phase; all have progressed to the Regular Phase. In the Regular Phase of the NFIP, the maximum amount of building coverage available is $250,000 on a single family home and $500,000 on a non-residential building. The contents coverage total insurance limits for a residential building is $100,000 and for a non-residential building it is $500,000. Coverage goes into effect immediately on a new loan. For an existing loan, there is a waiting period of 30 days before coverage goes into effect. For information regarding rates, available deductibles and maximum amounts of coverage available, policyholders should be advised to contact their insurance agents. Table 1 is a list of communities participating in the NFIP.

EMERGENCY PHASE



REGULAR PHASE

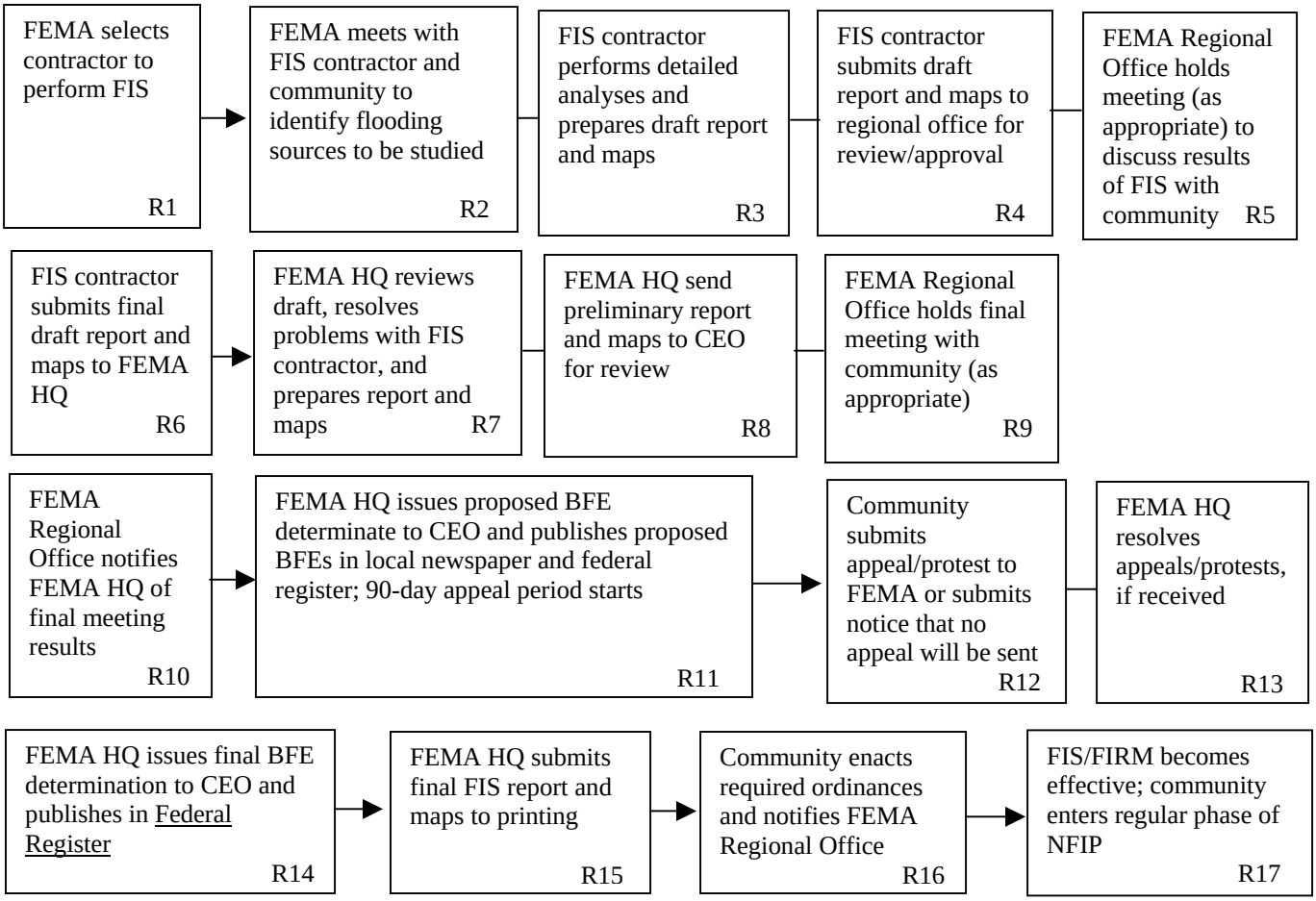


Figure 3: Milestone Chart for Community Participation in the NFIP

Table 1: Arizona Community Status List

TYPE	COMMUNITY	COUNTY	COMM. NUMBER	ORIGINAL MAP DATE	REGULATORY PROGRAM ENTRY DATE
R	Apache County	Apache	040001	07/05/82	07/05/82
R	Apache Junction	Pinal	040120	09/30/82	09/30/82
R	Avondale	Maricopa	040038	06/15/79	06/15/79
R	Benson	Cochise	040013	06/25/76	06/25/76
R	Bisbee	Cochise	040014	01/03/79	01/03/79
R	Buckeye	Maricopa	040039	02/15/80	02/15/80
R	Bullhead City	Mohave	040125	03/15/82	03/15/82
R	Camp Verde	Yavapai	040131	08/18/85	12/30/88
R	Carefree	Maricopa	040126	07/02/79	07/02/79
R	Casa Grande	Pinal	040080	08/01/77	08/01/77
R	Cave Creek	Maricopa	040129	06/09/88	06/09/88
R	Chandler	Maricopa	040040	07/16/80	07/16/80
R	Chino Valley	Yavapai	040094	09/01/81	09/01/81
R	Clarkdale	Yavapai	040095	12/01/82	12/01/82
R	Clifton	Greenlee	040035	03/01/84	03/01/84
R	Cochise County	Cochise	040012	12/04/84	12/04/84
R	Coconino County	Coconino	040019	11/16/83	11/16/83
S	Colorado River Indian Tribes	----------	040123	05/04/87	05/04/87
R	Colorado City	Mohave	040059	08/04/88	08/04/88
R	Coolidge	Pinal	040082	----------	06/10/80
R	Cottonwood	Yavapai	040096	09/16/81	09/16/81
R	Douglas	Cochise	040015	09/29/78	09/29/78
R	Duncan	Greenlee	040036	08/02/82	08/02/82
R	Eagar	Apache	040103	01/06/82	01/06/82
R	El Mirage	Maricopa	040041	12/01/78	12/01/78
R	Eloy	Pinal	040083	09/18/87	08/05/80

TYPE	COMMUNITY	COUNTY	COMM. NUMBER	ORIGINAL MAP DATE	REGULATORY PROGRAM ENTRY DATE
R	Flagstaff	Coconino	040020	01/19/83	01/19/83
R	Florence	Pinal	040084	08/17/81	08/17/81
R	Fountain Hills	Maricopa	040135	----------	02/04/94
R	Fredonia	Coconino	040021	03/17/82	05/17/82
R	Gila Bend	Maricopa	040043	12/04/79	12/04/79
R	Gila County	Gila	040028	09/27/85	09/27/85
R	Gilbert	Maricopa	040044	01/16/80	01/16/80
R	Glendale	Maricopa	040045	04/16/79	04/16/79
R	Globe	Gila	040029	05/01/80	05/01/80
R	Goodyear	Maricopa	040046	07/16/79	07/16/79
R	Graham County	Graham	040032	11/29/77	12/04/84
R	Greenlee County	Greenlee	040110	07/18/85	07/18/85
R	Guadalupe	Maricopa	040111	04/15/88	--------
R	Hayden	Gila	040104	09/14/79	09/14/79
R	Holbrook	Navajo	040067	09/30/83	09/30/83
R	Huachuca City	Cochise	040016	02/14/76	02/14/76
*	Jerome	Yavapai	------	----------	----------
R	Kearny	Pinal	040085	08/17/81	08/17/81
R	Kingman	Mohave	040060	08/15/77	08/15/77
R	La Paz County	La Paz	040122	09/19/84	09/19/84
R	Lake Havasu City	Mohave	040116	----------	09/01/81
R	Litchfield Park	Maricopa	040128	09/29/89	08/19/88
R	Mammoth	Pinal	040086	09/15/81	09/15/81
R	Marana	Pima	040118	08/01/84	08/01/84
R	Maricopa County	Maricopa	040037	07/02/79	07/02/79
R	Mesa	Maricopa	040048	05/15/80	05/15/80
R	Miami	Gila	040030	05/01/80	05/01/80
R	Mohave County	Mohave	040058	03/15/82	03/15/82

TYPE	COMMUNITY	COUNTY	COMM. NUMBER	ORIGINAL MAP DATE	REGULATORY PROGRAM ENTRY DATE
R	Navajo County	Navajo	040066	06/01/82	06/01/82
R	Nogales	Santa Cruz	040091	04/15/81	04/15/81
R	Oro Valley	Pima	040109	12/04/79	12/04/79
*	Page	Coconino	--------	----------	--------
R	Paradise Valley	Maricopa	040049	05/01/80	05/01/80
R	Parker	La Paz	040100	12/17/76	12/17/76
R	Patagonia	Santa Cruz	040092	03/18/80	03/18/80
R	Payson	Gila	040107	03/18/80	03/18/80
R	Peoria	Maricopa	040050	09/04/79	11/17/78
R	Phoenix	Maricopa	040051	12/04/79	12/04/79
R	Pima	Graham	040033	02/15/84	02/15/84
R	Pima County	Pima	040073	02/15/83	02/15/83
R	Pinal County	Pinal	040077	08/15/83	08/15/83
R	Pinetop-Lakeside	Navajo	040127	02/19/87	09/22/88
R	Prescott	Yavapai	040098	02/02/77	02/02/77
R	Prescott Valley	Yavapai	040121	08/16/82	08/16/82
R	Quartzsite	La Paz	040134	09/19/84	09/19/84
R	Queen Creek	Maricopa	040132	09/04/91	07/22/92
R	Safford	Graham	040124	----------	01/18/85
R	Sahuarita	Pima	040137	08/19/97	06/30/97
*	San Luis	Yuma	------	----------	--------
R	Santa Cruz County	Santa Cruz	040090	08/01/80	08/01/80
R	Scottsdale	Maricopa	040012	09/21/73	09/21/73
R	Sedona	Yavapai/ Coconino	040130	----------	12/30/88
R	Show Low	Navajo	040069	09/03/82	02/03/82
R	Sierra Vista	Cochise	040017	09/28/84	09/28/84
R	Snowflake	Navajo	040070	08/07/79	03/01/82

TYPE	COMMUNITY	COUNTY	COMM. NUMBER	ORIGINAL MAP DATE	REGULATORY PROGRAM ENTRY DATE
*	Somerton	Yuma	------	----------	--------
R	South Tucson	Pima	040075	----------	01/13/79
R	Springerville	Apache	040011	06/25/76	06/25/76
R	St. Johns	Apache	040010	06/16/93	03/30/81
R	Superior	Pinal	040119	07/31/79	08/11/82
R	Surprise	Maricopa	040053	01/15/78	12/15/78
R	Taylor	Navajo	040071	02/03/82	02/03/82
R	Tempe	Maricopa	040054	12/14/82	08/15/80
R	Thatcher	Graham	040117	12/15/83	12/15/83
R	Tolleson	Maricopa	040055	01/16/80	01/16/80
R	Tombstone	Cochise	040106	02/16/83	02/16/83
R	Tucson	Pima	040076	08/02/82	08/02/82
*	Wellton	Yuma	------	----------	--------
R	Wickenburg	Maricopa	040056	01/05/78	01/05/78
R	Willcox	Cochise	040018	07/17/78	07/17/78
R	Williams	Coconino	040027	12/15/83	12/15/83
R	Winkelman	Gila	040031	09/14/75	09/14/79
R	Winslow	Navajo	040072	09/16/81	09/16/81
R	Yavapai County	Yavapai	040093	08/19/85	09/18/85
R	Youngtown	Maricopa	040057	11/15/78	07/05/83
R	Yuma	Yuma	040102	07/05/83	07/05/83
R	Yuma County	Yuma	040099	12/15/83	12/15/83

R = Regular Program
E = Emergency Program
S = Suspended

NSFHA = No Special Flood Hazard Area
*** = Not in the NFIP (No Floodprone Areas)**

1.5 The Role of the State Coordinator or Agency

In 1977, Governor Raul Castro designated the Arizona Water Commission as the State Coordinating Agency for the NFIP. That responsibility shifted to the Arizona Department of Water Resources (ADWR) in 1980 when the commission became a part of the Department. ADWR has had certain responsibilities for floodplain management since 1973. As of October 1, 2000, almost all of these responsibilities were reassigned to the Arizona Division of Emergency Management (ADEM) except for item numbers 6, 9, and 12 in which, according to the A.R.S. ə 48-3605, ADWR shall develop and adopt criteria for establishing and delineating floodplains.

The specific duty of the NFIP State Coordinator or Agency is to be the link between FEMA and communities. The Coordinator or Agency is updated on NFIP issues and regulation interpretation. The National Flood Insurance Act (44 CFR Chapter 1, ə60.25 (b)) lists 12 duties and responsibilities for the State:

1. *Enact, whenever necessary, legislation enabling counties and municipalities to regulate development within floodprone areas*;

2. *Encourage and assist communities in qualifying for participation in the NFIP;*

3. *Assist county and municipal public bodies and agencies in developing, implementing, and maintaining local floodplain management regulations;*

4. *Provide local governments and the general public with Program information on the coordination of local activities with Federal and State requirements for managing floodprone areas;*

5. *Assist communities in disseminating information on minimum elevation requirements for floodprone areas;*

6. *Assist in the delineation of riverine and coastal floodprone areas, whenever possible, and provide all relevant technical information to the Administrator;*

7. *Recommend priorities for Federal floodplain management activities in relation to the needs of county and municipal localities within the State;*

8. *Provide notification to the Administrator in the event of apparent irreconcilable differences between a community's local floodplain management program and the minimum requirements of the Program;*

9. *Establish minimum State floodplain management regulatory standards consistent with those established in this part and in conformance with other Federal and State environmental and water pollution standards for the prevention of pollution during periods of flooding;*

10. *Assure coordination and consistency of floodplain management activities with other State, areawide, and local planning and enforcement agencies;*

11. *Assist in the identification and implementation of flood hazard mitigation recommendations which are consistent with the minimum floodplain management criteria for the NFIP; and*

12. *Participate in floodplain management training opportunities and other flood hazard preparedness programs whenever practicable.*

CHAPTER 2 - BRIEF OVERVIEW OF FLOODPLAINS AND FLOODWAYS

Flooding is a part of the earth's natural hydrologic cycle. The cycle circulates water through a process of evaporation, transpiration, precipitation, runoff, and stream flow. The process maintains an overall balance between atmospheric moisture and water on the surface and in the ground. An imbalance can occur when the flow of water is greater than the normal carrying capacity of the watercourse.

The magnitude, duration, and frequency of floods are influenced by a region's natural characteristics such as a watershed. A watershed is a natural drainage basin that conveys water runoff in the land-based portion of the hydrologic cycle. Water that is not absorbed by the soil and vegetation becomes surface water runoff, flowing into natural drainage lines following the local topography. These lines merge to form a hierarchical system of streams that include rills, creeks, and rivers.

A stream channel carries the normal flow of water through the watershed system. The area of flat or gently sloping land adjacent to the channel is the floodplain. It is a normally dry area susceptible to being inundated by water. Flooding usually involves a buildup of water in the channel, followed by overflow of excessive quantities of water that inundate the floodplain. The rise in water surface elevation is slow in large streams and rapid in smaller ones.

Flash flooding occurs commonly in Arizona. A flash flood consists of a rise in water surface elevation, with abnormally high water velocities, creating a "wall" of water moving down the channel and floodplain. Flash floods result from a combination of intense precipitation, steep slopes, small drainage basins, and high proportion of impervious ground surfaces. They occur in small streams that are shallow and dry, such as arroyos.

Another type of flooding is shallow flooding. This category includes unconfined flows over broad, relatively low areas such as alluvial plains; intermittent flows in arid or semi-arid regions that have not developed a system of well-defined channels; minor overbank flows that remain unconfined; overland flow of runoff in dense urban areas; and flows where heavy debris deposits cause constantly shifting channels. These types of flooding are also referred to as sheet flow, ponding, shallow overflow, and alluvial fan flow.

2.1 Riverine Studies

Riverine flooding occurs in rivers, streams, ditches, or other waterways that are subject to overbank flooding, flash floods, and urban drainage system flooding. Riverine studies involve, among other factors, the collection and analysis of information about the river's watershed, the topography, or the lay of the land along the river, precipitation, and the characteristics of the river itself.

2.1.1 Hydrology

In order to determine the depth of floodwaters and to determine the size or width of floodplains, engineers must first examine the watershed to determine the amount of water that will reach a stream and be carried by the stream during a flood event.

Hydrology is a science that deals with the distribution and circulation of water in the atmosphere, on land surfaces, and underground and is used to determine flood flow frequencies. The study of a watershed's behavior during and after a rainstorm is, therefore, hydrology. A hydrologic analysis determines the amount of rainfall that will stay within a watershed -- absorbed by the soil, trapped in puddles, etc. -- and the rate at which the remaining amount of rainfall will reach the stream.

The rainfall that reaches the stream is called runoff and increased runoff increases the flood discharge. Flood discharge is the amount of water flowing down a stream channel. Data for this measurement is taken by stream gages at specified locations along a given stream, also known as gaging stations.

Significant development or other changes in the watershed (both within a community and any upstream communities) can significantly change the flood discharges. Often, the increase in impervious areas associated with urbanization causes an increase in stream discharges. In addition, new technical data such as new regional equations, new design storms, and in some circumstance, the increase in the length of gage records, might significantly affect the base discharge estimation.

Runoff amounts and discharge rates vary depending on the soil type, ground slope, land use, and the presence of storm sewers. In general, more runoff occurs on non-vegetated land, on paved and built-on urban land, and on steeper slopes.

Discharges are estimated by using rainfall and snowmelt data and historical stream records or by using regional equations that represent such data. Computer models allow engineers to incorporate numerous watershed characteristics into the hydrologic analyses. Discharge rates also generally increase as the size of a watershed increases.

Upon completion of the hydrologic analysis, engineers have flood discharges for various size rainstorms that are measured at different points along a stream, such as at the confluence with another stream and at the mouth of a tributary stream.

2.1.1.1 Cross Sections

All detailed flood studies examine the areas through which floodwater will flow. This requires a determination of ground elevations and obstruction to flow for these areas. Accurate data on the channel geometry and changes in the floodplain are obtained from ground surveys, aerial photography, or topographic maps.

To locate the elevations at a site, surveyors have established benchmarks that are referenced to a common vertical elevation reference called a datum. The use of a datum ensures uniformity of references to land elevations and avoids misinterpretation of flood elevations.

Established benchmarks with a recorded elevation allow surveyors to describe the changes in the ground levels or stream characteristics as elevations relative to the referenced datum. They are also used by surveyors to determine the elevations of buildings that are at risk of flooding.

A cross section is a graphical depiction of the stream and the floodplain at a particular point along the stream. It is taken at right angles to the flow of the stream. At each cross section, the engineer has accurate information on the size and geometry of the channel, the shape of the floodplain, and the changes in the elevation of the ground. A typical surveyed cross section is shown in Figure 4.

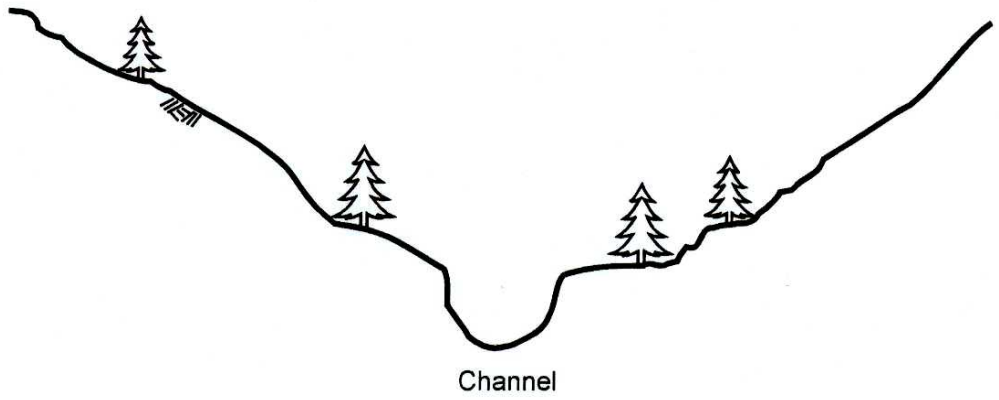


Figure 4: Surveyed cross section

Cross sections are taken of the floodplain at locations along the stream that are representative of local conditions. The more changes there are in topography, the more cross sections are needed to define the floodplain accurately.

The surveyors and engineers also estimate the roughness factor along the floodplain to determine how fast floodwater will flow through the area. Roughness factors are related to ground surface conditions, and they reflect changes in floodwater velocity due to ground friction.

A portion of the collected survey information is used in the hydrologic analysis, but the surveyed cross sections and other survey information are the building blocks of the hydraulic analysis and mapping efforts.

2.1.1.2 Hydraulics

Hydraulics is a study of floodwaters moving through the stream and the floodplain. It combines flood hydrology, cross section data, and stream characteristics. The data are usually processed using a computer model, most commonly HEC-2 or HEC-RAS, which were developed by the U.S. Army Corps of Engineers' Hydrologic Engineering Center.

Changes in hydraulic conditions of a stream usually occur when new bridges, culverts, and road crossings are constructed and when there are changes in the physical characteristics of the stream. If a bridge or culvert is not properly sized, it can cause floodwaters to back up, which increases flood levels upstream. Although most bridge openings and culverts are designed to allow stream flows associated with frequent storm events to pass without such backwater effects, they may still cause an increase in the base flood elevation. Therefore, any bridges, culverts, or other road crossings that have been constructed since the analyses for the effective Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs) were completed should be evaluated for their potential effect on the base flood and the associated floodway. In addition, any significant changes in the stream channel or floodplain geometry could affect the floodplain and floodway. One should always ask the questions: 1) has any portion of the floodplain been filled? 2) has the stream channel migrated or changed location because of significant erosion and/or depositions? 3) have any portions of the stream been channelized, widened, or dredged? 4) have there been significant changes in the vegetation in the floodplain? Aerial photographs are useful tools in evaluating changes in stream channels and floodplains.

The hydraulic study produces determinations of flood elevations, velocities, and floodplain widths at each cross section for a range of flood flow frequencies (Figure 5). These elevations are the primary source of data used by engineers to map the floodplain.

A FIS typically produces elevations for the 10-, 50-, 100-, and 500-year floods. Water Surface Elevations (WSEL) for the 10-, 50-, and 500-year floods are typically used for other floodplain management purposes. For example, the 10-year flood data may be used for locating septic systems, the 50-year flood for placing bridges and culverts, and the 500-year for locating critical facilities, such as hospitals.

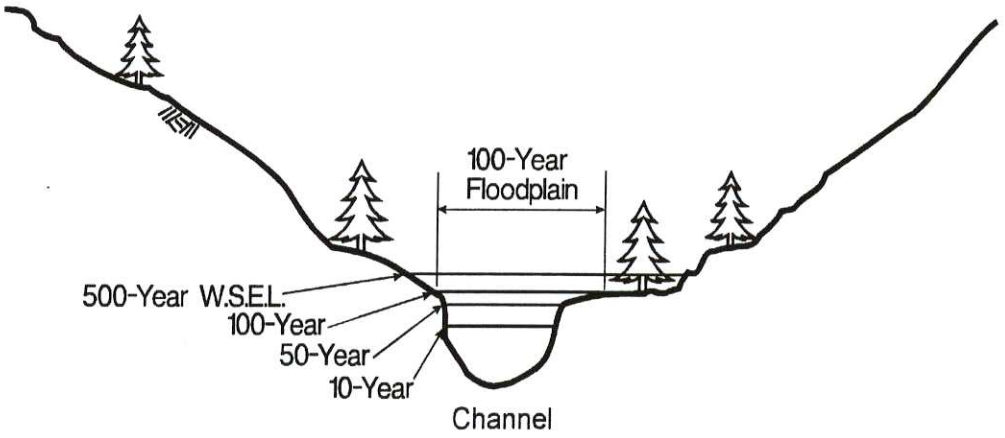


Figure 5: Cross section with flood elevations

2.1.1.3 Flood Profile

The hydraulic computer program generates potential flood elevations at each cross section, but flood elevations at locations between the cross sections need to be determined as well. This is done by plotting the elevations at the cross sections on a graph and connecting the plotted points. Such a graph is called a flood profile.

The horizontal axis or x-axis of the graph shows the distance along the stream, which is commonly called stationing. For stationing, begin at the mouth of a stream (its point of discharge into a larger body of water) and look upstream. Generally, when profiles are plotted, the slope of the streambed will rise as the graph is read from left to right.

For most profiles, the distance is measured above the mouth of the stream or above its confluence (where it meets with another stream).

The vertical axis or y-axis shows the elevations in feet. A legend at the bottom right corner shows the symbol for each flood profile plotted. Bridges are typically indicated with an "I" shaped symbol. The bottom of the "I" represents the bridge's low chord (lowest beam) and the top of the "I" represents the top of the roadway or the top of a solid bridge railing.

Additional information is usually provided on the profiles, such as corporate limits and confluences of smaller streams. Profiles also provide a picture of stream characteristics, such as steep sections of the streambed and where restrictive bridge openings cause floodwaters to back up.

2.1.1.4 Floodplain Map

The next step in the mapping process is to transfer the flood elevation data onto a map showing ground elevation data. This is called a topographic map or contour map because points with the same elevation are connected by a contour line. The topographic or contour map is often referred to as the base map.

The most common topographic maps used are produced by the U.S. Geological Survey (USGS). Some communities have prepared their own topographic maps and provided them to the Federal Emergency Management Agency (FEMA) during the study process to improve the accuracy of their floodplain maps.

The base flood elevations (BFEs) from the cross sections and profiles are plotted on the topographic map. Floodplain boundary lines are drawn connecting these plotted points using the contour lines as a guide. The completed map illustrates the Special Flood Hazard Area (SFHA).

It is important to remember that floodplain map boundaries are not more accurate than the topographic map on which they are drawn. Since the U.S. Geological Survey (USGS) topographic quadrangle maps have a small scale, the SFHA boundaries cannot be precisely mapped. This is important to remember when determining if a building is in or out of the floodplain, and therefore, the use of other relevant measurements may be required.

Be careful when correlating map features with ground features. The maps do not always represent exact conditions on the ground. Where there is an apparent discrepancy between floodplain boundaries shown on a map and actual ground conditions, the elevation data can be used to resolve the matter by locating the flood elevation on the ground via an elevation survey. This elevation represents the actual extent of flooding for that particular flood.

Banks and lending institutions who must read the FIRM to determine if flood insurance is required must follow the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a request for a map revision or map amendment so that the map can be officially changed to reflect the more accurate data.

2.1.1.5 Floodway Analysis

The final step in preparing most riverine flood studies is to produce the floodway analysis, which identifies where encroachment by development will increase flood elevations significantly and worsen flood conditions.

A floodway is defined as the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. The floodway is the stream

channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. FEMA has mapped designated floodways in more than 8,000 communities.

The remainder of the floodplain is called the flood fringe, where water is typically shallower and slower than the floodway. The National Flood Insurance Program (NFIP) minimum standards provide that flood fringe areas outside the boundaries of the floodway can be developed without further analysis. Consequently, all Arizona communities permit development in the flood fringe if the development is elevated or otherwise protected at or above the regulatory flood level elevation (one foot above base flood). Development in the floodway is allowed if it can be demonstrated that absolutely no rise in the BFE will occur. It is recommended, however, that floodway development be discouraged or even prohibited because of the hazardous nature of this area.

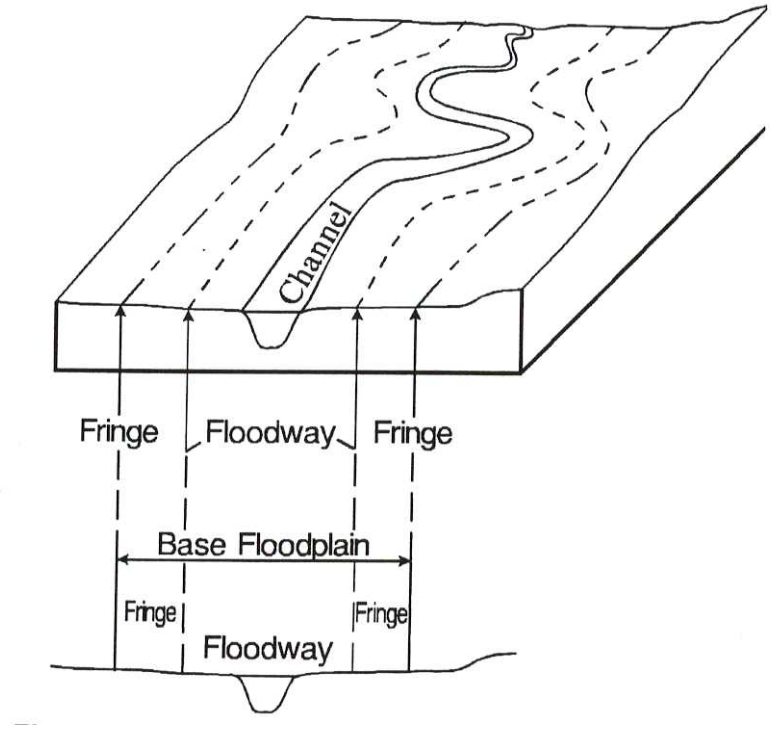


Figure 6: Floodway cross section and map

A floodway analysis determines the boundaries of the floodway using the following floodplain management concepts:

- Continued development in the floodplain will obstruct flood flows, which will back water up or divert it to other properties.

- Properties on both sides of a river or stream should be treated equitably. The degree of obstruction permitted now for one should be permitted in the future for the other.

- Property owners should be allowed to develop their land, provided they do not obstruct flood flows, cause damage, or create a nuisance to others. (A community may allow development in the flood fringe that cumulatively increases the base flood elevation (BFE), but NFIP regulations specify that such total increases cannot exceed one foot at any point along the stream. Some Arizona communities have more restrictive standards that must be met.)

A floodway analysis is done with a computer program to make the necessary calculations of the effects of further development. Beginning at both edges of the floodplain, the computer model starts "filling" the floodplain. This "squeezes" the floodwater toward the channel and causes the flood level to rise. At the point where this process reaches a one-foot rise, the floodway boundaries are drawn.

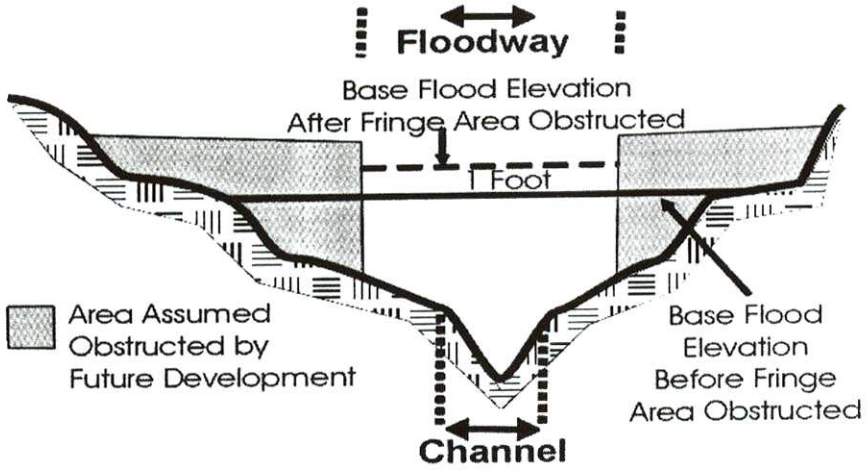


Figure 7: Computer floodway analysis

The floodway boundaries at each cross section are transferred to the topographic or contour map that shows the SFHA boundaries. The plotted points are connected to show the floodway and flood fringe on the floodplain map.

Not every cross section will show an exact one-foot rise. Topographic conditions and the need to "smooth out" the floodway line will result in some cross sections having increases of less than one foot.

Allowing flood heights to rise up to one foot is a compromise standard. Prohibiting any rise in flood heights would prohibit most types of new development or redevelopment. On the other hand, allowing development to cause significant increases in flood heights can cause great problems for others.

Arizona communities may use a more restrictive standard for delineating a floodway. Some may allow only a 0.5-foot, 0.1-foot, or no rise in the BFE in the floodway analysis. This results in wider floodways and less area in the flood fringe.

A floodway analysis should be prepared with close coordination between the modeling engineer and those who are responsible for community planning and floodplain management.

The number of possible floodway configurations is almost limitless. Therefore, in choosing a regulatory configuration, the interests of individual property owners and the community as a whole must be weighed.

2.2 Shallow Flooding Studies

For the NFIP, shallow flooding is defined as flooding with an average depth of one to three feet in areas where a clearly defined channel does not exist. Shallow flooding can exist in any of the following situations:

- Ponding: In flat areas, water collects or "ponds" in depressions.
- Sheet flow: In steeper areas where there are no defined channels or on flat plains, water will spread out over the land surface.
- Urban drainage: Local drainage problems can be caused where runoff collects in yards or swales or when storm sewers back up.

For the purposes of the NFIP, shallow flooding is distinguishable from riverine flooding because it occurs in areas where there is no channel or identifiable flow path.

Shallow flooding is mapped based on historic flood experiences and a study of the topography. In some areas, the techniques used for riverine studies are used. The result will either be a BFE or a base flood depth (in feet above the ground). A shallow flooding study usually produces data for the base flood but not for the 10-year or other floods.

2.3 The Flood Insurance Study

When a flood study is completed for the NFIP, the information and maps are assembled into a FIS. A FIS is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. If a community or county has more than one identified hazard, then the study results of each hazard analysis are combined and included in the FIS. The initial FISs have been completed for all floodprone communities in Arizona.

The FIS report and associated maps delineate the SFHA, designate flood risk zones, and establish BFEs. They serve as the basis for rating flood insurance premiums, for regulating floodplain development, and carrying out other floodplain management measures.

The study has three components:

- The FIRM - - Flood Insurance Rate Map
- The FIS - - Flood Insurance Study
- The Flood Boundary and Floodway Map, which is included in studies prepared before 1985. (Since 1985, floodways are shown on the FIRM.)

The FIS report includes:

- An appraisal of the community's flood problems in a narrative that describes:
  - the purpose of the study,
  - historic floods,
  - the area and streams studies, and
  - the engineering methods employed.
- A vicinity map of the community and, often, photographs of historic floods.
- Tables summarizing various study data.
- Computed flood profiles for various recurrence probabilities, usually the 10-, 50-, 100-, and 500-year floods.

The FIS provides the technical data for the adoption of floodplain management measures required for community participation in the NFIP and for the development of flood risk information needed to establish flood insurance premiums. A FIS appraises a community's flooding history; estimates flood flow frequency (10-, 50-, 100-, and 500-year return intervals); establishes flood elevation profiles; plots floodplain boundaries; provides data to delineate floodways; and establishes insurance risk zones. The FIS level of detail consists of an approximate study and a detailed study. An approximate study delineates the 100-year floodplain boundaries but does not determine the BFE. The detailed study determines the BFEs or depths of flooding and delineates the boundary of the 100-year floodplain.

The back up documentation for the information contained in the FIS, e.g., HEC-1 and HEC-2 computer runs, work maps, etc., is usually available through FEMA's technical review contractor, Michael Baker, Jr., in Alexandria, Virginia. This documentation has historically been microfiched and forwarded to the community and/or to the NFIP State Coordinator. This information should be made available to the public who anticipates development in a floodplain. The FIS, which provides the technical documentation used for preparation of the maps and for floodplain management, is also available through the Map Distribution Center.

2.3.1 Flood Insurance Rate Maps

FIRMs are produced by FEMA to depict areas that are subject to flooding. These maps are based on historic, meteorologic, and hydraulic data, as well as open-space conditions, flood control works, and development. FEMA generally conducts engineering studies, commonly referred to as FIS. Using the information gathered in these studies, FEMA engineers and cartographers delineate SFHAs on the FIRMs. SFHAs are subject to inundation by a flood that has a 1-percent or greater chance of being equaled or exceeded during any given year. This type of flood is commonly referred to as the 100-year or base flood. The 100-year flood is used by the NFIP as the basis for flood insurance and land use planning requirements nationwide.

FIRMs for each community contain a variety of information, including common physical features, such as major highways, secondary roads, lakes, railroads, streams, and other waterways; graphic representations and spatial distributions of flood hazard areas; BFEs; flood insurance risk zones; and areas subject to inundation by the 100- and 500-year flood. They may also show areas designated as regulatory floodways and, in some instances, velocities.

FEMA distributes these maps to a wide range of users. Private citizens, insurance agents and brokers, community officials, the lending industry, and federal agencies all use the maps to assist them in understanding flood hazards. Private citizens and insurance agents and brokers use the maps to locate properties and buildings and corresponding flood insurance risk zones. Community officials use the maps to administer floodplain management regulations and mitigate flood damage. Lending institutions and federal agencies use the maps to locate properties and buildings and determine whether flood insurance is required when making loans or providing grants for the purchase or construction of buildings.

FIRMs can be obtained from FEMA's Flood Map Distribution Center. To obtain a copy of the current flood map for a specific community, use the following contact information:

Federal Emergency Management Agency
Flood Map Distribution Center
6930 San Tomas Road
Baltimore, MD 21227-6227
Telephone: 1-800-359-9616
Fax: 1-800-358-2849

To facilitate the request and before contacting the Map Distribution Center, gather the following information:

- Full name of the community shown on the flood map (including city, town, village, county, and state).

- The community identification number and letter suffix that appear in the title box of the index.

- The community-panel number and letter suffix that appear in the title box of each panel.

Generally, for multiple-panel flood maps prepared in the Z-fold format, the Map Distribution Center will provide copies of specific panels rather than a copy of the entire flood map. Therefore, before ordering, the following should be considered:

- A panel may not be printed for the portion of the community that is of interest. If this occurs, a note on the index will explain why.

- The area of interest may not be in the community whose FIRM the user is reviewing. A property's post office address may include the name of a nearby-incorporated community even though the property is really in the unincorporated area of the surrounding county. Therefore, it may be necessary to review the flood map for the county.

- Areas recently annexed by a community may not appear on the flood map for that community. To obtain flooding information for these areas, obtain the flood map for the community from which the areas were annexed.

Since the beginning of the NFIP, many improvements have been made to the design of flood maps so that they are easier to use and better meet the users' needs. To control costs, FEMA includes design improvements in flood maps on a community-by-community basis as new flood maps are produced.

2.3.2 Map Revisions

FEMA has four approaches to changing the NFIP maps: restudies, limited map maintenance projects, amendments, and revisions. After a community receives their initial maps, it is their responsibility to assure that the FIRMs are up-to-date and accurate. Each time development causes a change to a SFHA, the community must provide the new information to FEMA within six (6) months.

Following are terms used for the NFIP map revisions (excerpted from FIA-12 December, 1993, Appeals, Revisions, and Amendments to National Flood Insurance Program Maps):

- *Conditional Map Amendment.* A response to a request that FEMA determine whether a proposed structure, if built as planned on a legally defined parcel of land that is on natural ground or fill placed prior to the first NFIP map showing that area to be in an SFHA, would be excluded from the SFHA as shown on the

effective NFIP map. When FEMA makes such a determination, it issues a letter, referred to as a Conditional Letter of Map Amendment (CLOMA). A CLOMA **does not officially amend** the effective NFIP map.

- *Map Amendment.* A response to a request for exclusion of individual structure(s) and/or legally described parcel(s) of land that were inadvertently included in the SFHA shown on an effective NFIP map. When FEMA determines that structure(s) or parcel(s) of land have been inadvertently included in the SFHA, FEMA issues a letter, referred to as a Letter of Map Amendment (LOMA). The LOMA excludes the structure(s) and/or parcel(s) of land that were inadvertently included in the SFHA and officially amends the effective NFIP map.

- *Conditional Map Revision.* A response to a request that FEMA determine whether a proposed project, such as a flood-control structure, would warrant a revision to an effective NFIP map after the structure is completed. A proposed structural modification could consist of a proposed floodplain modification project or simply the proposed placement of fill for the elevation of one or more structures or parcels of land.

  FEMA's comments on such requests are known as "conditional determinations." When such conditional determinations are warranted, they are issued in letters, referred to as Conditional Letters of Map Revision (CLOMRs) and Conditional Letters of Map Revision based on Fill (CLOMR-Fs), that describe the effect(s) that the proposed project or fill would have on the effective NFIP map. A conditional determination **does not actually revise** an effective NFIP map.

  A floodplain development permit should not be issued until a CLOMR is received.

- *Map Revision*. A change to an **effective** NFIP map. The effective map for a community is the latest map issued by FEMA for that community. The NFIP maps, including the BFEs, base flood depths, floodways, and other flood risk information they may contain, become effective after they are published and distributed. The effective date is shown on the title box of each panel of the map and may be labeled as "Effective Date," "Revised," or "Map Revised." When a map revision is warranted, FEMA will either revise and republish the affected map panels (and, if necessary, the FIS report), referred to as a Physical Map Revision (PMR), to show the appropriate changes or issue a letter, referred to as a Letter of Map Revision (LOMR), that describes the changes and officially revises the effective map.

- *Limited Map Maintenance Program (LMMP).* This program covers small-scale studies that affect a small portion of an area subject to flooding. It allows a maximum expenditure to determine base flood elevations in an area previously studied. It can be used to study one stream in a community or to correct hydraulic

or hydrologic errors in existing FIS. The LMMP program may also be used to evaluate the effects of changed hydraulic or hydrologic conditions, particularly where flood risks are increasing. This program encourages cost sharing with other agencies.

- *Restudy*. FEMA will fund a restudy of a community where the need arises from population growth into unmapped areas or changes in hydrology or topography from flood events. Priority is given to communities that assist financially in the study. FEMA will ask the State Coordinating Agency for a prioritized list of needs within the State. The agency will then encourage communities to submit their requests with justifications. FEMA encourages cost sharing by state, community, or other agencies. FEMA then contracts for the study as if it were an original flood insurance study.

In October 1992, FEMA implemented changes to Part 72 of the NFIP regulations, "Procedure and Fees for Obtaining Conditional Approval of Map Changes." As a result, requestors are required to submit payment for FEMA's review of requests for map revisions.

FEMA has also instituted another processing change to assist communities/requestors in developing supporting technical data for map change requests and to allow FEMA to respond to these requests more efficiently. On October 1, 1992, FEMA implemented the use of detailed application/certification forms for requesting revisions or amendments to the NFIP maps. These detailed application/certification forms are the MT-EZ Form 81-92, MT-1 Form 81-87, and MT-2 Form 81-89. A current copy of these forms can be downloaded from FEMA's website (http://www.fema.gov/mit/tsd/EN_main.htm).

These forms were implemented for two reasons. First, because the forms provide a step-by-step process for requestors to follow and are comprehensive, requestors are assured of providing all of the necessary information to support their requests without having to go through an iterative process of providing additional information in a piecemeal fashion. Experience has shown this to be a time-consuming and cost-intensive process. Second, because use of the forms assures that the requestors' submissions are complete and more logically structured, FEMA can complete its review in a shorter time frame and at a lesser cost to the requestor. While completion of the forms may appear to be burdensome, FEMA believes it is prudent to do so because of the advantages that result for the requestor.

FEMA's publication, "FIA12, Appeals, Revisions, and Amendments to Flood Insurance Maps, A Guide for Community Officials," explains in detail requirements for changes to FIRMs. Appendix G explains the types of revisions that may be made and lists the types of information that must be provided to FEMA in order for them to determine that a revision is appropriate. While these procedures may seem cumbersome and expensive, the result may be an annual savings of several hundred dollars per structure.

2.3.2.1 Flood Insurance Study/Restudy Outline

The procedural steps listed below describe the actions a flood coordinator and a FEMA regional representative take before, during, and after a flood insurance study or restudy is selected to be completed throughout the fiscal year.

1. *FEMA regional engineers request the NFIP State Coordinators to forward the study/restudy requests.* These are prioritized by the state and then by FEMA according to their benefit/cost formula. The communities can improve their chances by providing aerial mapping, surveyed cross-sections, or completing hydrologic and hydraulic analyses.

2. *FEMA then notifies the NFIP State Coordinator which communities have been chosen and when they want to hold time and cost meetings.* The State Coordinator then notifies the communities and schedules meetings with the FEMA regional representative, the study contractor, the coordinator, and the community floodplain administrator. At these meetings, the areas that the community wants to have studied are drawn on USGS quads or FIRMs.

3. *The study contractor gives FEMA an estimate, in writing, of how much it will cost to complete the entire study requested by the community*. When an agreement on scope and cost has been reached between all concerned, written agreements are prepared and FEMA advises when the study may commence.

4. *The community is also given the opportunity to review the hydrology if they desire.* The comments developed during the review process are forwarded to the study contractor and a copy is sent to the FEMA regional office.

5. *The study contractor completes the hydraulic study and the work maps are prepared.*

6. *An interim meeting should be held with the state, community, FEMA regional engineer, and the study contractor to review the work maps.* At this meeting, any discrepancies should be noted and corrected. All parties involved should be in agreement that the work maps depict what actually happens in the area during flood events and that the flood elevations are reasonable.

7. *The work maps and the supporting documentation are forwarded to FEMA's technical evaluation contractor who then reviews the maps for printing in preliminary form*. **When the community receives the preliminary map, there should be no change from the information contained on the work map.** It should be reviewed thoroughly by the floodplain administrator; the street names and other landmark information should be corrected if there are any errors. The FIS should also be reviewed for the accuracy of the information provided in it. If there are errors, they should be noted. The corrections should be forwarded to FEMA as soon as possible after receipt of the preliminary FIRMs and FIS.

8. *Before the effective date of the new FIRMs, a final meeting will be held with the community, the NFIP State Coordinator, and a FEMA regional representative.* This does not have to be a public meeting; but, if the community wants a public meeting, they can arrange it. By that time, everyone should concur on the correctness of the mapping. After that time, if any changes are to be made to the maps, the LOMR process will have to be followed. The community is expected to adopt the final maps. If they do not, they will be in violation of the requirements of the NFIP and could face probation.

9. If the community wants to assure the correctness of their FIRMs and accompanying FIS, each time preliminary FIRMs and FIS are received, they should be reviewed. Necessary corrections should be made and forwarded to FEMA with a brief explanation. This is particularly true of the historical information that FEMA may not have received through a study contractor.

2.3.2.2 LOMR Process

A step-by-step revision process is outlined below.

1. Obtain FIS back up data (hydrology, hydraulics, and mapping) from FEMA.

2. If needed, survey existing (pre-project) cross sections of the stream or watercourse at the proposed project site. This is the basis for the pre-project model.

3. Design to meet both State and FEMA criteria and all other local, state, and federal permit requirements.

4. Revise the FIS models to reflect the new bridge, culvert, or roadway encroachment. Also, revise models to include more detailed topographic information or additional channel cross sections.

    - Use FIS discharges unless new hydrology is significantly different.

    - The downstream starting water surface elevation is obtained from the FIS profile.

    - The new data is inserted into the FIS model for the revised reach.

    - The new model must be run far enough upstream to tie into the FIS profile (within 0.1 foot typically, but not more than 0.5 foot difference).

    - Complete the Application/Certification Forms (MT-2) and submit to the community responsible for floodplain administration for submission to FEMA.

- Make sure the community signs the Application/Certification Forms after they are sure the revision conforms to their floodplain management ordinance.

- FEMA issues Additional Data Letter if application and back up data are not complete.

- FEMA issues a LOMR. A fee is required for the engineering review and administrative processing associated with FEMA's response to requests for LOMRs, unless the request is fee exempt. A copy of the fee schedule for engineering and administrative processing is included on page 3 of the MT-2 form.

MT-1, MT-2, and EZ forms are located in Appendix L or access the Internet web site http://www.fema.gov/mit/tsd/EN_main.htm.

CHAPTER 3 - FLOODPLAIN MANAGEMENT BY THE COMMUNITY

3.1 Introduction

A community is a governmental body with the statutory authority to enact and enforce development regulations. These governmental bodies vary from state to state, but can include cities, towns, villages, townships, counties, parishes, special districts, states, and Indian nations. The community's role is of paramount importance. Residents and property owners can get flood insurance only if the community carries out its responsibilities. The role of the community is to enact and implement floodplain regulations required for participation in the National Flood Insurance Program (NFIP). The community must meet minimum state and NFIP regulations and commit to the following:

- Adopt flood damage prevention ordinances.
- Designate a local floodplain administrator.
- Issue or deny floodplain development/building permits.
- Inspect all developments to assure compliance with the local flood damage prevention ordinance.
- Maintain records of floodplain development indefinitely.
- Assist in the preparation and revision of floodplain maps.
- Help residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures.

3.2 The Model Flood Damage Prevention Ordinance

Ordinance is the generic term for a law passed by a local government. The authority to enact an ordinance comes from state law. Arizona requires communities to enact and enforce floodplain management laws (Arizona Revised Statutes (A.R.S.) §§ 48-3601 through 48-3627), and these laws set the following ordinance parameters:

- Minimum regulatory standards – many states mandate a minimum regulatory flood elevation (RFE) requirement and floodway encroachment standard.
- Prerequisites for enacting or amending the ordinance – a zoning ordinance may have to be based on a comprehensive plan or be adopted only after a public hearing.

- Requirements for issuing variances or allowing special uses.

- Prerequisites for the administering official – the community may need to have a certified building official enforce its building code.

The Arizona Department of Water Resources (ADWR) has developed a model ordinance, and it is included in Appendix F. It is also available in digital format upon request. This model was patterned after a model developed by the Federal Emergency Management Agency (FEMA) Region IX staff. The model is intended to meet the minimum requirements of the A.R.S. ə 48-3601, et seq. and the National Flood Insurance Act (NFIA) of 1968 as amended. In certain sections of the model, the appropriate phrasing and language for counties is not the same as the appropriate language for cities and towns. In each case, alternate sections have been provided. For communities adjacent to the Colorado River, the model contains references from the Colorado River Floodway Act, PL 99-450.

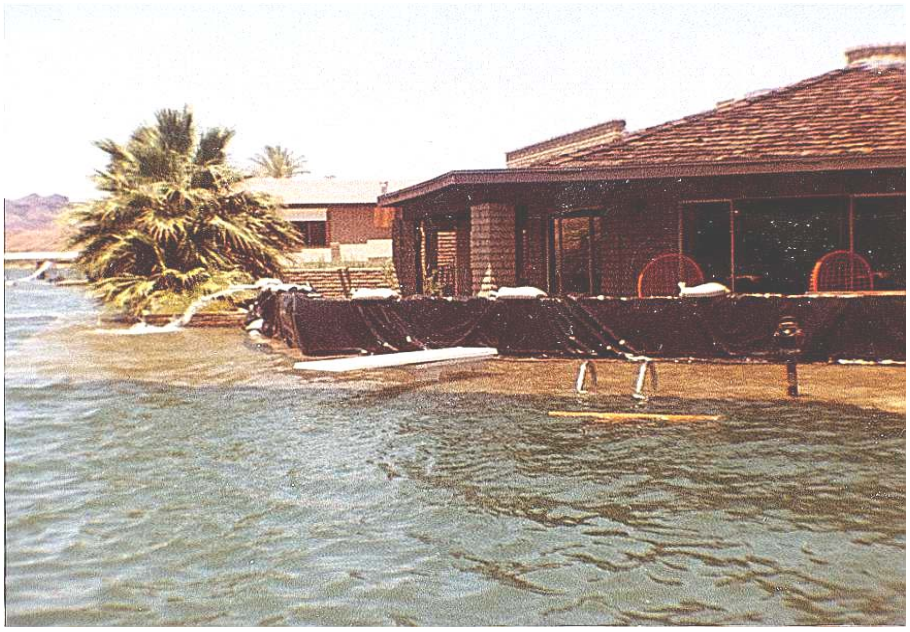


Figure 8: The 1983 flood along the Colorado River

The NFIP State Coordinating Agency staff can assist communities with reviewing and drafting changes to their ordinances. Whenever a community changes its floodplain management ordinance, a copy should be sent to the state agency and to FEMA, Region IX.

3.3 Local Floodplain Administrator

As previously mentioned, the community is required to designate a local floodplain administrator per their flood damage prevention ordinance. The local floodplain administrator might be an existing local staff person, such as the building inspector, community zoning official, engineer, or planner. The community also might contract to have the job done by the county, regional planning agency, another jurisdiction or authority, or a private firm. In general, the administrator has the responsibility, authority, and means to implement the floodplain management ordinance the community has adopted in compliance with the NFIP requirements and the state statutes. The duties of the administrator vary depending on the demographics of the community; however, there are some duties that are common to all administrators:

- *Knowledge of Regulations.* An understanding of the general and technical provisions of various federal, state, and local regulations is important in order to explain them and assist potential applicants.

- *Assist with Permit Applications.* Inform the public of which permits are needed, how to obtain them, and provide assistance to the applicant.

- *Process Permit Applications.* Review permit applications for compliance with applicable local regulations. This process involves: collecting permit fees, assessing accuracy and completeness, evaluating design plans and technical data, identifying deficiencies and devising ways to correct them, issuing or denying permits, and informing applicants about the appeals or variances processes.

- *Program Coordination.* This includes advising the applicant on the need for additional local, state, or federal permits for the proposed development; notifying adjacent communities and the NFIP State Coordinating Agency prior to any alteration or relocation of a watercourse; and informing adjacent communities of plans for a substantial commercial development or large subdivision that could affect their flood hazard areas.

- *Project Oversight.* Periodic and timely on-site inspections must be performed in order to confirm that development follows the approved plans and to verify lowest floor elevations.

- *Correct Violations.* All complaints must be evaluated and investigated. If necessary, the administrator may use legal recourse to correct the violations.

- *Enforcement Actions.* When noncompliant activities are discovered, the appropriate actions must be made to resolve the situation. Actions may involve issuing stop-work orders or other violation notices, coordinating enforcement procedures with the community's attorney, or appearing in court.

- *Record Keeping.* Elevation/floodproofing data, variance requests, and other administrative forms should be on file indefinitely for all development located in

SFHAs. Project files should be developed and maintained for each development permit application.

- *Update Flood Data and Maps.* An adequate supply of maps depicting the regulatory floodplain should be maintained and available for the community's use. All map corrections and notices of map revisions should be recorded and denoted on administrative maps, with the details kept in an indexed file. FEMA and the State must be notified as soon as possible of an annexation or when the community has assumed or relinquished authority to adopt or enforce floodplain management regulations for a particular area. FEMA and the state must be notified within six (6) months of physical changes that can affect flooding conditions.

- *Interpretation of Map Boundaries.* When there appears to be a conflict between the boundary on the flood map issued by FEMA and the actual field conditions, the floodplain administrator must interpret the boundaries of the flood hazard area. A lender may still require documentation if field conditions indicate that a structure is NOT in the floodplain.

- *Delineate the 100-year Floodplain.* When FEMA has not provided Base Flood Elevation (BFE) data, the local administrator must delineate or require the developer to delineate the 100-year floodplain. State Standards have been developed by ADWR to assist the local floodplain administrator to complete the required delineation, and these standards are included in Appendix M.

- *Ordinance Update.* The ordinance must be revised within six (6) months after changes in federal or state laws and/or regulations. If new flood data has been provided by FEMA, the ordinance must be revised within six (6) months to adopt the data and regulatory requirements appropriate for that level of data. Copies of the revised ordinance must be submitted to FEMA and to the NFIP State Coordinator after the adoption.

3.3.1 Development of a Permitting System

Each community participating in the NFIP is required to issue development permits for all proposed construction to determine if the proposed development is located in a floodprone area. It is important to note that the concept of "development" goes beyond the traditional "building" permit. The NFIP regulations define development as any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials. Therefore, the development permit's broad scope includes buildings and alterations to landscape which would affect drainage patterns or the flood-carrying

capacity of the watercourse. Any structural or nonstructural activity that may affect flooding characteristics or flood damage is in need of a permit.

If the area to be developed is in a floodplain, the applicant needs to apply for a floodplain use permit. The permit application should include the following information:

- A complete description of the proposed activity. Enough information must be included so that the floodplain administrator can determine if the proposed activity will be safe from flooding and if it will increase flood hazards elsewhere. At a minimum, there should be plans drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, or any other landscape alterations; meets the requirements of the local floodplain ordinance.

- The Mean Sea Level (MSL) elevation of the lowest floor of all proposed enclosed area structures (including detached and nondetached garages, basements, and accessory buildings).

- The MSL elevation to which any proposed nonresidential structures will be elevated or floodproofed.

- Certification by a registered professional engineer or architect that any floodproofing method to be used meets the NFIP floodproofing criteria.

- BFE data for all proposed structures.

- A description of the extent to which any watercourse (stream, river, or drainage ditch) will be altered or relocated.

3.3.2 Reviewing the Floodplain Permit Application

The floodplain administrator must make sure the proposed activity meets the standards of the NFIP and the A.R.S. as required by the community's floodplain management ordinance. The standards address: anchoring requirements, construction materials and methods, utilities, subdivisions, encroachments, elevation of the lowest floor, and floodways. In reviewing an application, **the key to remember is that the proposed activity itself must be safe from flooding and it must not increase the BFE or otherwise negatively impact nearby existing development.**

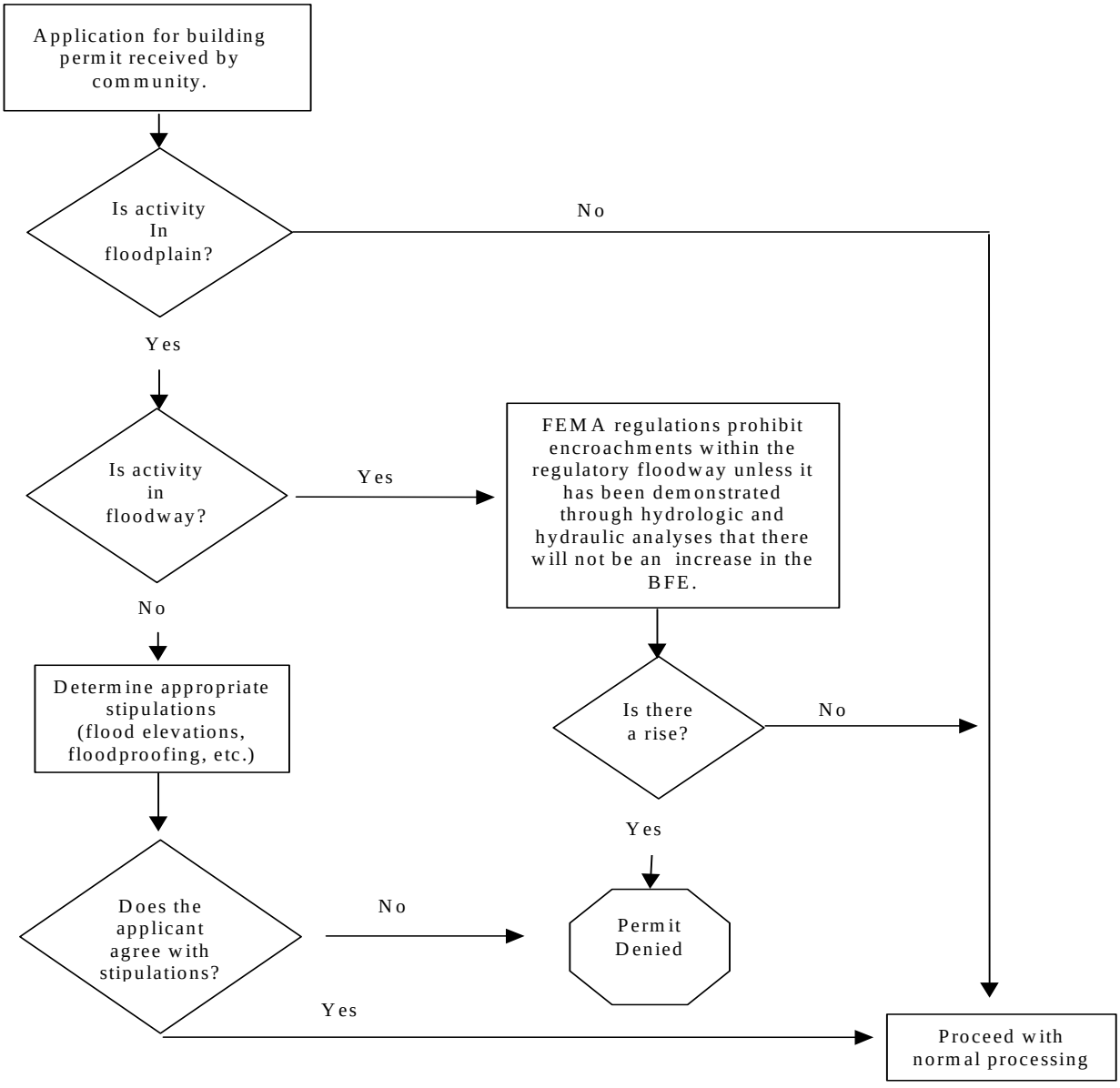


Figure 9: Sample Procedure for a Single Lot Building Permit Request

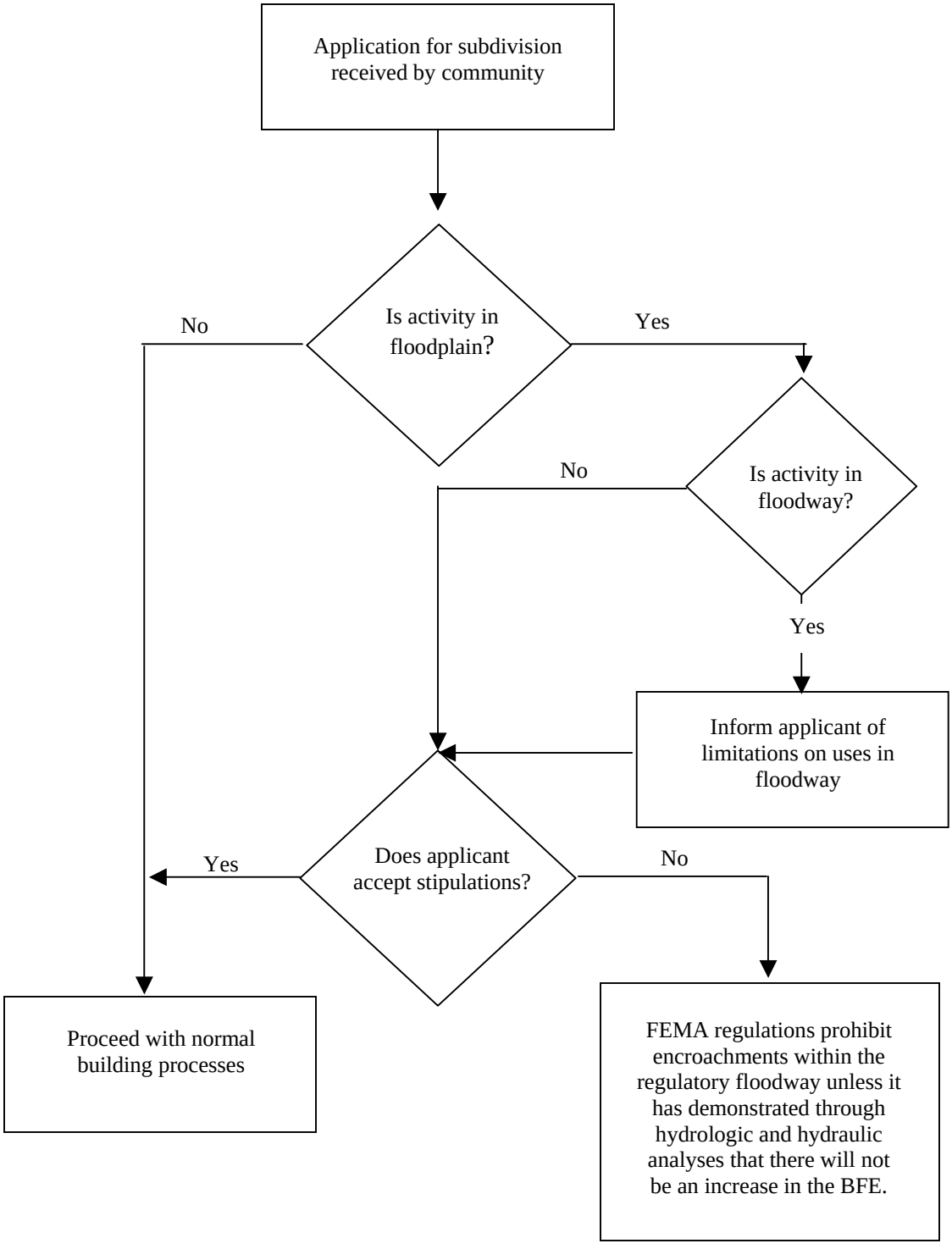


Figure 10: Sample Procedure for a Subdivision Request

3.3.2.1 NFIP Floodway Encroachments

If a community has a regulatory floodway delineated on a Flood Boundary Floodway Map (FBFM) or Flood Insurance Rate Map (FIRM) and the floodplain administrator determines that the proposed development is located in the floodway, then a permit must not be issued unless the applicant can demonstrate, through detailed engineering analysis, that the proposed development will not increase the BFE at all. Usually, floodway developments are limited to passive open space uses such as recreation or agriculture.

When reviewing applications for development in the floodway, the floodplain administrator's first assumption must be that it will cause some rise in the BFE. The developer is required to prove that the proposed development, along with similar future development assumed by equal degree of encroachment, will not cause any increase in BFEs. The developer provides this proof by hiring a registered professional engineer to analyze the development plans and ascertain if the BFEs will be affected. The developer should use an engineering firm experienced in analyzing and modeling hydrologic and hydraulic data.

Unless the analysis establishes that no rise to the base flood would result, the permit must be denied. Deviation from this no rise analysis is in violation of the NFIP regulations. The community must retain on file certifications that establish that development in the floodway will not increase the BFE. A copy of the engineer's supporting documentation must be kept with that particular permit record indefinitely. Any development allowed in the floodway must satisfy the remaining program regulations. For example, structures must be protected to the RFE.

Structures existing in a floodway prior to the floodway identification and designation are "grandfathered in" and can remain as long as they serve a useful purpose. Any substantial improvement (50 percent of the market value or more) to such structures must meet the requirements (i.e. elevation) of the current floodplain ordinance.

3.3.3 Application Approval or Denial

Once the review is completed and if the proposed development complies with local floodplain management ordinance, the permit is issued. The day the permit is issued is considered to be the date of the “start of construction,” provided that actual construction begins within the following 180 days.

If the application is not in compliance and the permit is denied, the applicant can pursue the options listed below:

- Withdraw the application;
- Redesign the development so that it meets the standards of the community's floodplain management ordinance;

- If the applicant believes the administrator is in error, the decision may be appealed to the local governing body; or

- In very rare instances, a variance to the ordinance may be requested if the applicant believes the ordinance places an undue hardship on his or her property. Before issuing any variance, contact the NFIP State Coordinating Agency for prior approval.

3.3.4 Inspections

Inspections are made to confirm that the actual construction meets the conditions of the permit. Inspections should be made during several phases of construction to reduce potential errors. The first inspection should be made before the ground is broken in order to verify the horizontal location with respect to the location of the floodplain and floodway boundaries, setbacks from lot lines and channel banks, and floodway encroachments.

A second inspection should be scheduled just before the installation of the lowest floor. The inspector should verify that the lowest floor is being built at the height stipulated in the permit application and that the foundation is the type specified in the plans. The type of foundation dictates when the inspection should take place. For example, a slab foundation inspection is conducted when the forms are placed. If the building plans indicate that the building is to be floodproofed, then the inspection should be performed when that portion of the project is completed.

It should also be confirmed that the placement of fill meets the necessary compaction, slope, and protection standards; building's location matches the permit location; the number and size of crawlspace or enclosure openings; and whether any part of the project encroaches into the floodway.

The final inspection should occur when the construction project is complete. This will verify that the foundation and floor elevation has not been altered, enclosures are adequate, utilities are not subject to flooding, floodway encroachments, and anchoring systems.

A certificate of occupancy is issued after the project passes the final inspection and enables the owner to move into the building. It should be noted that the site should be periodically checked to ensure that the property continues to remain in compliance over time.

3.3.4.1 Sample Field Inspection Checklist

The following checklist is designed to be used by the community during the handling of permitting of structures located in a SFHA. This checklist can be modified and conformed to meet the community's needs.

Please complete the following entries:

PERMIT NUMBER: _____

ADDRESS OF STRUCTURE: _____

DATE OF INSPECTION: _____

INSPECTOR: _____

APN OR TRACK/LOT NUMBER: _____

SITE INFORMATION:

TYPE OF STRUCTURE: Residential Γ Nonresidential Γ

NUMBER OF STORIES: _____

		YES	NO
1)	Condominium unit?	Γ	Γ
2)	Has a variance been issued for the below grade condition? (Attach a copy of any variance issued for floodplain management related issues.)	Γ	Γ
3)	Indicate the Base Flood Elevation (BFE) shown on FIRM: Indicate height above grade in AO Zone	Γ	Γ
4)	Lowest floor elevation: show/define location and height above sea level unless AO Zone	Γ	Γ
5)	Lowest adjacent grade of structure: NGVD 29/ NAVD 88; indicate which and elevation	Γ	Γ

		YES	NO
6)	Is a floodproofing certificate required and is it attached?	Γ	Γ
7)	If a multi-story structure, is there a below-grade parking area?	Γ	Γ
8)	Is an enclosed below-grade parking area involved?	Γ	Γ
a)	Is it fully enclosed?	Γ	Γ
b)	Is it partially enclosed?	Γ	Γ
c)	Is the area wet?	Γ	Γ
d)	Is the area dry floodproofed?	Γ	Γ
9)	Has an elevation certificate been initiated/completed?	Γ	Γ
10 a)	Is the foundation slab on grade?	Γ	Γ
b)	Or is it perimeter?	Γ	Γ
11 a)	Is the garage attached?	Γ	Γ
b)	Is the garage separate?	Γ	Γ
12)	Have the proper foundation openings (vents) been placed in accordance with TB 1-93?	Γ	Γ
13)	Are there openings on at least two sides of the structure?	Γ	Γ
14)	Are the bottom of the openings no more than 12 inches above the lowest adjacent grade (both interior and exterior of perimeter foundation)?	Γ	Γ
15)	Is the perimeter foundation backfilled so that interior grade is at/above exterior grade?	Γ	Γ
16)	Are construction materials used below the regulatory flood elevation (RFE) and are they resistant to flood damage?	Γ	Γ
17)	Are utilities installed above the RFE or protected or resistant to flood damage (e.g. protected with anti-backflow valves or like devices)?	Γ	Γ

		YES	NO
18)	Are HVAC systems elevated adequately to be at or above RFE?	Γ	Γ

3.3.5 Deficiencies and Violations of FEMA Guidelines

When a community has failed to enforce its floodplain management program in compliance with the NFIP criteria and the FEMA regional office has identified one or more program deficiencies or violations, FEMA may initiate an enforcement action against the community in order to obtain compliance. A substantive program deficiency or violation is one that has resulted or could result in increased potential flood damages or flood stages in the community.

Some examples of Substantive Program Deficiencies include:

- Failure to require permits for proposed construction or other development within floodprone areas and to review such permit applications and subdivision proposals to assure that all such construction and development is adequately designed, located, constructed, and anchored to minimize flood damage.

- Failure to develop BFEs or require developers to develop BFEs in accordance with standards developed by the Director of ADWR as criteria for establishing local elevation and floodproofing requirements.

- Ordinances that are not compliant with the NFIP floodplain management criteria.

- Ordinances that do not contain adequate enforcement provisions or that cannot be enforced through other mechanisms.

- Administrative procedures or practices that are not workable or cannot reasonably ensure compliance with the local ordinance.

- Variance procedures that are not consistent with the NFIP variance criteria.

- Failure to operate and maintain flood protection projects that have been credited by FEMA as providing 100-year flood protection.

- Failure to notify FEMA and the NFIP State Coordinating Agency of any changes to the FIRMs or FHBMs as a result of new development or annexation or deannexation.

Some examples of Substantive Violations include:

- Obstruction of floodways or stream channels that increase flood stages.
- In A-Zones, applying to new construction and substantial improvements:
  - residential structures that are located with their lowest floor, including basement, below the RFE;
  - residential structures that are not adequately anchored to resist flotation, collapse, or lateral movement;

- nonresidential structures that are not elevated and anchored or floodproofed;
- structures without elevation certificates or floodproofing certificates; and
- structures with enclosures below the RFE used for purposes other than parking, access, or storage.

Although all participating communities are required to enforce compliant NFIP ordinances, not all communities have the same capabilities; and the seriousness of deficiencies and violations will vary. Because of this, various mitigating and aggravating factors are taken into consideration by FEMA, and all enforcement actions are handled on a case-by-case basis. Mitigating factors do not relieve a community of its obligation to correct all deficiencies and remedy violations.

Some examples of Mitigating Factors include:

- The community has demonstrated willingness to take positive actions to resolve past problems.
- Due to a lack of adequate local resources, including professional staff, the community has had to rely on the availability of technical and administrative assistance from state, regional, or private sources.
- Deficiencies in the local program have not resulted in increased exposure to flood losses.
- There is no history of prior violations identified by FEMA.
- FEMA has had no prior contact with the community.
- Newly elected officials or recently hired staff have demonstrated a new attitude toward NFIP compliance on the part of the community.
- The violation occurred a number of years in the past.
- There are only isolated instances of violations or a single program deficiency rather than a pattern of widespread program deficiencies or violations.
- A particular remedial measure would undermine the credibility of local officials or their efforts to achieve compliance.
- The present owner of a property in violation was not the owner at the time the structure became noncompliant.

Examples of Aggravating Factors include:

- The community has not demonstrated willingness to take positive actions to resolve past problems.
- The community has adequate resources available to it, including professional staff or other sources of technical assistance that have not been utilized.
- Deficiencies in the local program have resulted in increased exposure to flood losses.
- There is a history of prior violations or program deficiencies identified and brought to the community's attention by FEMA.
- FEMA has had prior contact with the community.
- FEMA has provided technical assistance to the community.
- The violations occurred recently.
- There is a pattern of widespread program deficiencies or violations as opposed to an isolated instance of noncompliance.
- The present owner of a property in violation also was the owner at the time the structure became noncompliant (applies only when determining appropriate remedial measures).

Examples of Methods to Correct Deficiencies:

- Amend ordinances to close loopholes or correct other program deficiencies that allowed the violations to occur.
- Amend ordinances to include more effective enforcement provisions or add penalty provisions.
- Change administrative procedures to improve the permitting and inspection process. This could include revisions of permit, certification, or inspection forms; changes in inspection procedures; or changes in procedural instructions given to the building inspector and other staff.
- Pass a resolution of intent to fully comply with the NFIP requirements.
- Change or increase staff or resources used to enforce the local ordinances. (FEMA generally does not mandate this remedial measure.)

- Provide missing elevations or floodproofing certificates.

Examples of Methods to Remedy Violations:

- Demonstrate that the structure is not in violation by providing missing elevation or floodproofing certificates.
- Submit engineering data showing that floodway fill results in "no increase" in flood stage.
- Rescind permits for structures not yet built or in the early stages of construction.
- Tear down or modify the noncompliant structure or remove fill in the floodway. (If the structure or other development cannot be made fully compliant, a lesser degree of protection should still be provided.)
- Develop and implement a master drainage plan or construction flood control works to protect noncompliant structures.
- Seek civil/criminal penalties as provided for in the local ordinance or community code. In the case of a judgement in court against the community in such an action, the community is expected to appeal the decision if there are grounds.
- Initiate licensing actions against architects, engineers, builders, or developers responsible for the violations.
- Submit survey data/documentation required to verify insurance rates for existing policies.
- Submit evidence that the structure cannot be cited (legal constraints in state or local legislation, deficiencies in the ordinance, etc.).
- Submit sufficient data to verify the information submitted by the property owner of an uninsured building so that FEMA can ensure the building is properly rated if a flood insurance policy is applied for in the future.

3.3.6 Enforcement

If development activities are occurring without permits or are contrary to the approved plans, the ordinance must be enforced. By enforcing the ordinance, the severity of flood damages can be reduced. Adequate, uniform, and fair enforcement requires two things:

1. All new development or improvements to existing development must have a permit.

2. All development must adhere to the standards of the NFIP and the local floodplain ordinance.

Communities need to establish a procedure to ensure these two requirements are met. For example, the best way to ensure the first requirement is to have a PERMIT form displayed at the development site in full view. Such a form could be brightly colored so it is easily seen. It should be printed on durable material to withstand the weather during the construction period. If construction is taking place without a permit, it can be readily observed. Communities can ensure the development is being built to the NFIP standards by having the local administrator make inspections during the construction period. Such inspections should be documented in the project file.

If enforcement is to occur, it is recommended that voluntary compliance be the first choice to resolve the situation. If this method does not work, other methods that can be used are administrative steps, legal, contact the NFIP State Coordinator, or Section 1316.

Once again, the most favored way to handle this type of situation is to convince the developer that complying with the ordinance is in the best interest of the community. An explanation of flood hazard and property protection rules may be necessary to mention. It is important to realize that even though the developer is not interested in flood insurance, the future owner may want it and may be required to purchase it.

The administrative process involves the floodplain administrator contacting the property owner and expressing concerns, notifying the property owner in writing of the nature of violations and how to correct them, and posting a violation notice. If a problem is found during construction, a stop-work order can be issued or the certificate of occupancy can be withheld.

If this does not bring results, the local floodplain administrator can meet with their attorney and discuss future legal action or further options.

After consulting with the NFIP State Coordinator and FEMA Region IX, another method is to resort to the Section 1316 of the National Flood Insurance Act of 1968. This process authorizes FEMA to deny flood insurance to a property declared in violation of the community's ordinance (refer to Section 3.3.6.2). Denying flood insurance could mean that the property may be difficult or impossible to sell, the market value of the property may fall, the cost of suffering flood damage without insurance may be a risk to the owner, lending institutions may threaten foreclosure on the mortgage, and any permanent reconstruction will be denied disaster insurance.

3.3.6.1 Legal Consideration: Hearings, Certifications, and Recordations

The National Flood Insurance Act (NFIA) of 1968, as revised, and the Arizona Revised Statutes (A.R.S.) require certain activities in conjunction with floodplain management. Civil attorneys experienced in municipal government have suggested other activities to protect communities from liability and to ensure the viability of floodplain regulations. This discussion will differentiate between legal requirements and suggestions for a floodplain board's legal counsel to consider.

NFIA requires a community to adopt a floodplain management regulation as a condition of eligibility in the NFIP. A community is not required to join the NFIP, but nonparticipation precludes community property owners from purchasing flood insurance; federally insured lenders from making loans on (for) floodplain property; and makes certain federal disaster relief funds unavailable to the community and its residents.

A.R.S. ə 48-3604 requires governing bodies of counties in Arizona to adopt and enforce floodplain regulations. It also gives the counties the right to allow incorporated cities and towns within the county to adopt and enforce their own floodplain regulations. These regulations may be adopted only after a public hearing, which has been legally advertised for at least 30 days. A notice of the hearing and a copy of the proposed regulation are sent to the NFIP State Coordinating Agency, as is a copy of the adopted regulation within five (5) days after the adoption. If a floodplain regulation is adopted in order to make the community eligible for the NFIP, it must be submitted to the FEMA Region IX office.

A.R.S. ə 48-3604 requires management of the 100-year floodplains by the Floodplain Board. NFIA has explicit criteria for floodplain management (40 CFR ə1910.3) and a variance procedure with specific requirements. If a Floodplain Board grants a variance, it must: 1) notify the applicant that flood insurance premiums will increase and that construction below the 100-year flood elevation increases the risk to life and property (40 CFR ə1910.6(a)(5)) and 2) maintain a record of all variance actions indefinitely and report them in their biennial report to FEMA (40 CFR ə1910.6(a)(6)). If a variance permit or waiver is granted contrary to the adopted floodplain regulation, A.R.S. ə 48-3609 requires the Floodplain Board to notify the applicant that the land upon which the variance is granted is ineligible for exchange of state land pursuant to the flood relocation and land exchange program. The Floodplain Board must record a copy of that notice so that it appears in the chain of title.

Although a public hearing for a variance request is not required by NFIA or the A.R.S., decisions by a Floodplain Board must be made at open meetings, which are usually the regularly scheduled meetings of the governing body of the community. Because the granting of a variance may adversely affect an adjacent property owner, the community may choose to have hearings on variance requests.

3.3.6.2 Implementation of Section 1316 of the National Flood Insurance Act of 1968

Part 73 of the National Flood Insurance Rules and Regulations provides a means for a community to declare an individual structure to be in violation of the local floodplain management ordinance. In instances where local enforcement actions have failed, such as a stop-work order, this can be used as additional leverage.

Section 1316 of the National Flood Insurance Act of 1968 provides for the denial of flood insurance coverage for any property found to be in violation of a community's floodplain management ordinance. Besides the unavailability of flood insurance, there will be no grants or loans available after a flooding disaster from either the state or federal governments. Loans or guarantees made by federal agencies such as Small Business Administration, Federal Housing Administration, and Veterans Administration will not be available for acquisition of or construction on the structure.

The declaration for denial of flood insurance must be made by a "duly constituted local zoning authority or other public body." The declaration must be in writing and must include:

- A reference to the specific state or local laws, regulations, or ordinances of which the structure is in violation;
- A reference to the specific enforcement provision of the law, regulation, or ordinance that authorizes the local body or individual to declare the structure to be in violation;
- An adequate street address or legal description of the structure in violation and the name of the property owner;
- Evidence that the property owner has been provided notice of violation and of the prospective denial of flood insurance; and
- A clear description of the violation in a statement specifically declaring the identified structure to be in violation of the law, regulation, or ordinance provision referenced.

A cover letter including the above information should be forwarded to FEMA Region IX with a copy to the NFIP State Coordinating Agency.

The availability of flood insurance coverage will be restored upon a finding by the administrator that a declaration of violation has been rescinded. A rescission should be submitted to the administrator through the regional office, with a copy to the NFIP State Coordinating Agency, and must include:

- The name of the property owner(s) and an address or legal description of the property and to enable FEMA to identify the previous declaration;

- A clear and unequivocal statement by an authorized public body rescinding the declaration and giving the reason(s) for the recession;

- A description of and supporting documentation for the measures taken in lieu of denial of insurance in order to remedy the violations; and

- A clear statement that the public body rescinding the declaration has the authority to do so and a reference to that authority.

The procedures and steps for implementing Section 1316 include:

1. The local zoning authority or other authorized public body declares the structure to be in violation of its local ordinance intended to discourage or restrict development or occupancy of floodprone areas.

2. The local authority submits the declaration and necessary back up documentation described above to the Region with a copy to the NFIP State Coordinating Agency. A cover letter identifying it as a Section 1316 submission should be included.

3. The Region reviews the submission and makes the following preliminary determinations, obtaining additional information from the community if necessary:

    a. The individual or body issuing the declaration or rescission is authorized to do so;

    b. The ordinance or regulation that has been violated is intended to discourage or otherwise restrict land development or occupancy in floodprone areas; and

    c. The address and legal description that accompany the declaration provide sufficient information to deny insurance.

4. The Region submits its recommendation along with the declaration or rescission and supporting documentation to the U.S. Office of Loss Reduction (OLR) which evaluates the recommendation in light of the requirements for implementing Section 1316 (see above).

5. The OLR obtains the determination of the administrator (or official designee) on a finding that the property has been duly declared to be in violation is now declared to be compliant.

6. The OLR forwards a copy of the findings to the Region so that the State and community can be notified.

7. A copy of the finding(s) is forwarded to the NFIP servicing contractor.

8. The NFIP servicing contractor receives each submission and determines whether it represents a current policy or an application. Then the contractor either denies the issuance of the policy using language approved by the Flood Insurance Act (FIA) or places an edit in the computer system in order to notify the property owner at renewal time that the policy cannot be renewed because of a finding of a violation pursuant to Section 1316. If the finding represents a rescission, the contractor removes the edit from the system so that a policy can be issued. The servicing contractor maintains a permanent record of all such actions.

It is important for the community and the property owner to know that this denial of flood insurance and disaster assistance will remain **WITH THE PROPERTY** until the violation is rectified.

3.3.7 Community Failure to Enforce Floodplain Management Regulations

The FEMA Regional Office IX or the NFIP State Coordinating Agency periodically reviews the community's floodplain management program and permit records. Both agencies may inspect records as part of a community assistance visit (CAV) or community assistance contact (CAC). If a community does not uphold its part of the agreement and fails to enforce its floodplain management regulations, FEMA has recourse through reclassification under the Community Rating System (CRS), probation, suspension, or subrogation. These FEMA enforcement remedies are typically used as a last resort after a community has failed to resolve identified program deficiencies and violations (refer to Section 3.3.5).

3.3.7.1 Reclassification under the Community Rating System

The CRS provides a discount in the flood insurance premiums for properties in communities that participate in the CRS. CRS communities that are deemed to no longer be in full compliance with the NFIP requirements can be reclassified to Class 10. If this happens, residents would lose their CRS flood insurance premium discounts.

3.3.7.2 Probation

Probation allows a period of time for the community and FEMA to work out identified problems, deficiencies, or violations. Probation can be imposed and terminated by FEMA's Regional Director in San Francisco and can be continued for up to a year after the community corrects all program deficiencies. FEMA specifies what corrective actions or remedial measures

need to be taken by the community in order to have probation lifted.

During probation, an additional premium charge of $50 per policy will be levied on all new and renewed flood insurance policies. (Policyholders will be informed that the reason for the surcharge is that the community is on probation for not enforcing their floodplain management ordinance.) This surcharge is based on a one-year time period beginning with the imposition of probation and will be in effect the first year and during any successive one-year periods during which the community remains on probation. If the probation period lasts three months, the surcharge is still in effect for the remainder of the year; if probation lasts 13 months, the surcharge is in effect for 24 months. Probation is lifted or extended at the discretion of the FEMA Regional Director.

Samples of a 90-day probation letter to the community, a media release on probation, and a policyholder notice of a community on probation are shown on the following pages.

These examples are from FEMA 7810.3:

EXAMPLE 3-1
Sample 90-day Probation Letter

Date

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Honorable
Mayor
Community, State, Zip Code

Dear Mayor _____:

This is to inform you that (community name) will be placed on probationary status with the National Flood Insurance Program (NFIP) on (date), unless measures are taken prior to that date to correct the identified deficiencies in your local floodplain management program and remedy all known violations of your (local floodplain regulations title) to the maximum extent possible. Probation serves as a formal notice to your community that its implementation of the local floodplain management program is regarded as non-compliant with the minimum criteria of the NFIP. Probation is the first step in the process to suspend community eligibility to participate in the NFIP, the result of which is the loss of available flood insurance coverage within the community.

As noted during a meeting with members of your staff on (date) and in follow-up correspondence to you dated (date), and (date), the following program deficiencies and violations must be addressed.

Program Deficiencies

1. Failure to obtain and maintain certification of the elevation in relation to mean sea level of the lowest floor of all new construction in the special flood hazard area.

2. Failure to require permits for placement of mobile homes in the special flood hazard area.

Violations

1. Structures without required elevation certificates *[Example Addresses listed below]*.

    1100 Riverview Drive
    550 Creek Street
    717 Creek Street
    206 Fourth Avenue (mobile home)
    207 Fourth Avenue

2. Structures without permits *[Example Addresses listed below]*.

   206 Fourth Avenue (mobile home)

To correct these program deficiencies and remedy the violations to the maximum extent possible, the following actions must be taken:

1. Revise administrative procedures to require the completion of an elevation certificate for all future new construction in the special flood hazard area and establish a system for keeping the certifications on file in the city offices. Submit evidence of having done so to this office.

2. Complete elevation certificates for each of the five structures listed above, submit copies to this office, and retain originals in city files.

3. Revise permitting procedures to ensure that permits are obtained for placement of mobile homes in the special flood hazard area. Submit a description of the new procedures to this office.

4. For the mobile home placed without a permit at 206 Fourth Avenue, issue a citation or take other appropriate action as provided for in the enforcement section of the local ordinance. Inform this office of the action that has been taken.

If these remedial measures are not taken, the NFIP probation will become effective on (date). The failure of your community to adequately administer or enforce its local floodplain management program in compliance with the minimum criteria of the NFIP results in additional liability to the Program from the increased exposure to flood risk. During the probation period, flood insurance coverage will remain available within your community; however, a $50.00 surcharge will be added to the premium of each new or renewal flood insurance policy sold within the community for a period of no less than one year from the effective date of probation. Probation will remain in effect until all program deficiencies have been corrected and all violations remedied to the maximum extent possible. Furthermore, the $50.00 annual surcharge will continue to be added to the premium of all new or renewal flood insurance policies sold during any extended or successive probation periods.

If the remedial measures are not taken during the specified probation period, (community name) will become subject to suspension from the NFIP. In the NFIP suspended communities where flood insurance coverage is no longer available, the Flood Disaster Protection Act of 1973 prohibits federal agencies from making grants, loans, or guarantees for the acquisition or construction of structures located in an identified flood hazard area. This restriction applies to assistance from the Federal Housing Administration (FHA), Veterans Administration (VA), and the Small Business Administration (SBA) among others. If a flood disaster occurs in a suspended community, federal disaster assistance for the

acquisition, construction, or repair of insurable structures within an identified flood hazard area is not available. Furthermore, Individual and Family Grant assistance for housing and personal property located in an identified flood hazard area is also not available.

You are encouraged to take the necessary remedial measures to avoid the impending probation action and possible subsequent suspension from the NFIP. If you have any questions or at any time need technical assistance to address these issues, please contact (name) , Chief of the Natural and Technological Hazards Division at (telephone #) , or your state coordinator for the National Flood Insurance Program (NFIP).

Sincerely,

(name)
Regional Director
FEMA Region (#)

* 90-Day Probation Letter must be sent to the community at least 31 days prior to the start of the 90-day probation period.

EXAMPLE 3-2
Sample Media Release on Probation

Officials of (community name) have been sent written notification that unless remedial measures are taken, the community will be placed on probation on (date), for deficiencies in the local floodplain management program and violations of ordinances required for participation in the National Flood Insurance Program (NFIP).

The NFIP is a federally-backed program administered by the Federal Insurance Administration (FIA), part of the Federal Emergency Management Agency (FEMA). The program provides flood insurance coverage to residents of communities that agree to participate by adopting and enforcing adequate floodplain management ordinances and practices. Until recent years, flood insurance was not normally available except through the government's NFIP. Some private-sector companies have begun to offer the coverage under arrangements with FIA but only in the NFIP participating communities.

(name), Director of FEMA's Region (#), which includes (community name), signed the probation notification. The notice included a specific list of program deficiencies and apparent violations. Probation will become effective on (date), unless the community takes action to correct the program deficiencies and remedy the violations to the maximum extent possible. The failure of the community to adequately administer or enforce its local floodplain management program in compliance with the minimum criteria of the NFIP results in additional liability to the Program from the increased exposure to flood risk. He emphasized that probation does not affect the availability of flood insurance and that residents will continue to be able to purchase and renew flood insurance during the probation period. However, a $50.00 surcharge will be added to the premium of each new or renewal flood insurance policy sold within the community for a period of at least one-year beginning the day the probationary period begins and will continue to be charged, on an annual basis, for each flood insurance policy sold or renewed in the community during which any successive probation period remains in effect.

"Placing a community on probation is a notification to that community that its program is regarded as noncompliant with the NFIP criteria and that the program deficiencies and violations are serious enough to lead to eventual suspension of the community from the Program. A suspension would mean that flood insurance coverage would no longer be available within the community. This is significant because the coverage is required as a condition of certain mortgages from federally backed or regulated lenders and some forms of Federal disaster assistance," (name) said.

He explained that the regional office will continue to provide technical assistance and consultation to any city to help it remedy the violations and achieve program compliance with the minimum criteria of the NFIP.

Note: Depending on the circumstances, the region may wish to include examples of the types of program deficiencies and violations that have been identified.

EXAMPLE 3-3
Policyholder Notice of Community Probation
National Flood Insurance Program

COMMUNITY NAME: _____ NFIP COMMUNITY NUMBER: _____

EFFECTIVE DATE OF COMMUNITY PROBATION: _____

The purpose of this notice is to advise you that the Federal Emergency Management Agency (FEMA) has notified your community of an impending probation action regarding its participation in the National Flood Insurance Program (NFIP). Community eligibility to participate in the NFIP is based upon the adoption and enforcement of local floodplain management regulations that meet the minimum requirements of the Program. Communities that fail to adequately administer or enforce their local floodplain management regulations in accordance with these requirements are subject to probation under the NFIP unless certain remedial measures are taken prior to the effective date of probation.

Probation serves as formal notice to your community that its implementation of the local floodplain management program is regarded as non-compliant with the minimum criteria of the NFIP. The failure of your community to adequately administer or enforce its local floodplain management program in compliance with the minimum criteria of the NFIP results in additional liability to the program from the increased exposure to flood risk. During the probation period, flood insurance coverage will remain available within your community; however, a $50.00 surcharge will be added to the premium of each new or renewal flood insurance policy sold within your community for a period of at least 1 year from the effective date of probation.

In order to avoid this impending probation action, your community must demonstrate compliance with the minimum criteria of the NFIP to the Federal Insurance Administration (FIA) of FEMA. Compliance can be achieved by correcting deficiencies in the local floodplain management program and by remedying any known violations of the community's floodplain management regulations to the maximum extent possible. If your community chooses not to pursue these actions, it will become subject to suspension from the NFIP. In NFIP suspended communities, where flood insurance coverage is no longer available, the Flood Disaster Protection Act of 1973 prohibits Federal agencies from making grants, loans, or guarantees for the acquisition or construction of insurable structures located in an identified flood hazard area. This restriction applies to assistance from the Federal Housing Administration (FHA), Veterans Administration (VA), and the Small Business Administration (SBA) among others. If a flood disaster occurs in a suspended community, Federal disaster assistance for the acquisition, construction, or repair of insurable structures within an identified flood hazard area is not available. Furthermore, Individual and Family Grant assistance for housing and personal property located in an identified flood hazard area is also not available.

Your community is encouraged to take the necessary action to avoid the impending probation action and possible subsequent suspension from the NFIP. For further information, you may wish to contact the appropriate community officials who are responsible for administering your local floodplain management program.

3.3.7.3 Suspension

When efforts to resolve identified community deficiencies do not meet FEMA's conditions or otherwise fail under probation, the community may be removed from the program. Suspension authority lies with the FEMA Washington, D.C. office. The effects of being suspended from the NFIP are as follows:

- Flood insurance will no longer be available. No resident will be able to purchase a flood insurance policy.

- If the community withdraws or is suspended, existing flood insurance policies will not be renewed.

- No federal grants or loans for buildings may be made in identified flood hazard areas under programs administered by federal agencies such as the Department of Housing and Urban Development and Small Business Administration.

- No federal disaster assistance may be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.

- No federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas.

- Federally insured or regulated lending institutions such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that:
  - There is a flood hazard and
  - The property is not eligible for federal disaster relief.

A sample summary of enforcement problems is shown on the following page.

EXAMPLE 3-4
Sample Summary of Enforcement Problems for Inclusion in Suspension Recommendation

SUMMARY OF ENFORCEMENT PROBLEMS

I. Introduction

(Region recommends that Community, State be suspended from participation in the National Flood Insurance Program (NFIP) for failure to adequately enforce its floodplain management regulations. This recommendation is based upon the multiple and substantive program deficiencies and violations summarized below. Attempts to resolve these problems through community assistance and consultation with local officials have been unsuccessful.)[1]

II. Uncorrected Program Deficiencies

(Community has failed to correct the following substantive program deficiencies.)

A. (Community has failed to require building permits for all proposed construction in areas of designated flood hazard.)

1. (No procedure exists by which permit applications are screened to determine if the proposed development is subject to required flood damage prevention measures.)

2. (Required by Article 4, Section 3 of Community Flood Damage Prevention Ordinance and 44 CFR ∋60.3(b)(1).)

3. (Community was requested to correct this deficiency by establishing a procedure to review permit applications and note on the permit form any applicable elevation, floodproofing, etc. requirements, and by submitting to the regional office evidence of having done so.)

B. (Community has failed to obtain and utilize base flood elevation data available from federal, state, or other sources.)

1. (Community has not used existing data as a basis for regulating new development.)

2. (required by ....)

3. (Community was requested to correct this deficiency by ...)

[1](Sentences in parentheses are meant to serve as examples.)

C. (Community has issued variances inconsistent with the NFIP variance criteria.)

1. (Community has not obtained adequate justification for variances granted.)

2. (Required by Article 6, Section 2 of Community Flood Damage Prevention Ordinance and 44 CFR ɔ60.6.)

3. (Community was requested to correct this deficiency by ...)

D. Etc.

III. **Unremedied Violations**
(Community has failed to remedy the following substantive violations:)

A. (New construction without building permits or elevation certificates.)

1. (1316 Creek Street, 1315 Creek Street, 1320 Creek Street, 2001 Fourth Ave.)

2. (Required by Article 5, Section 1 of Community Flood Damage Prevention Ordinance and 44 CFR ɔ60.3(b)(1).)

3. (Remedial measure required: implement enforcement provisions of ordinance and obtain elevation certificate.)

B. (Buildings constructed below required elevation.)

1. (4565 Martin Drive, elevation LF = 491 MSL, BFE = 496 MSL; 8900 Seventh Ave. elevation LF = 495 MSL, BFE = 498 MSL)

2. (Required by Article 5, Section 2 of Community Flood Damage Prevention Ordinance and 44 CFR ɔ60.3(c)(2).)

3. (Remedial measure required: implement enforcement provisions of Community Flood Damage Prevention Ordinance at Article 7, Section 7-8.)

C. (Encroachments of floodway.)

1. (Southeast corner of Pine Street and Oak Avenue, along Jeams Creek-fill.)

2. (Rear of property at 112 Gould Lane -- brick retaining wall.)

3. (Prohibited by Article 6, Section 1 of the Community Flood Damage Prevention Ordinance and 44 CFR ∋60.3(d)(3).)

4. (Remedial measures required; demonstrate development would result in no rise in flood levels or, if such cannot be demonstrated, implement enforcement provisions of Community Flood Damage Prevention Ordinance at Article 7, Section 7-8.)

D. Etc.

IV. Corrective Actions and Remedial Measures Taken by Community

A. (Since the identification of compliance problems within the community, it has remedied two violations not listed above by producing elevation certificates showing those structures to be in compliance.)

B. (Community has corrected one program deficiency not listed above by revising its building inspection procedures so that the elevation is verified before the floor slab is poured.)

V. Chronology of Contacts with Community

A. (Community entered Regular Program 5/1/82.)

B. (First Technical Assistance Visit held 1/4/83.)

C. (Community requests technical assistance on applying variance guidelines 4/20/83. Regional office sends written guidance on variances 5/1/83.)

D. (Community Assistance and Program Evaluation meeting held 5/7/84. Community advised about proper variance procedures; permitting system reviewed and found to have procedural gaps resulting in some applicants not being advised of flood zone requirements; and elevation certificates not being obtained. Community requested to correct deficiencies; sample elevation certificates supplied.)

E. (7/2/84, Community submits evidence of new permitting procedures, requested elevation certificates.)

F. (Community Assistance Visit held 5/25/85. Program deficiencies and apparent violations noted above identified.)

3.3.7.4 Subrogation

Subrogation is an action brought when flood damages have occurred, flood insurance claims have been paid, and all or part of the damages can be attributed to acts or omissions of a community.

Before subrogation can take place, these actions must happen:

- the community must be in the Regular Phase of the NFIP;
- flood damages occur to property carrying flood insurance;
- flood insurance claims are paid by FEMA based on the property damage caused by flooding;
- FEMA believes negligence by a third party has contributed to the flood damages occurring as covered by flood insurance policies; and
- FEMA sues to recover the money paid out in claims it feels attributable to a third party. This third party is believed to have caused, contributed, or aggravated the documented flood damages. This third party could be a community, a political entity, a developer, or an engineer.

The community in which the damages have occurred would be determined by FEMA to be negligent in its floodplain management efforts. Extensive investigation and documentation by FEMA would precede any subrogation efforts by the agency.

Communities must make sure that new floodplain developments are built at or above the RFE. Communities must consciously guide development so new development is not subject to flood damage and assure that these developments do not impact surrounding property, thereby increasing that property's susceptibility to flooding.

3.4 Substantial Improvement

Substantial improvement, as defined in 44 Code of Federal Regulations (CFR) Section 59.1, means:

> "Any reconstruction, rehabilitation, addition or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred 'substantial damage', regardless of the value of or actual cost of repair work performed. The term does not, however, include either (1) any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which

have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or (2) any alteration of a 'historic structure', provided that the alteration will not preclude the structure's continued designation as a 'historic structure'."

The development standards of the NFIP (and the State Floodplain Management Act) are intended to protect new construction from flood damage. The regulations interpret "new construction" to include substantial improvements to existing structures. The reason for this interpretation is that any improvement that significantly increases the value of a structure should be protected from the effects of flooding. By using the "50 percent of market value" as a cutoff level, the regulations strike a balance between the competing demands for sound floodplain management and the needs of owners of existing structures.

All building improvement projects that require a permit need to be evaluated for substantial improvement, such as remodeling projects, rehabilitation projects, building additions, and repair and reconstruction projects. Projects that are not subject to substantial improvements are those for which the community does not require permits, such as reroofing and minor maintenance. The substantial improvement rule includes all buildings that are pre-FIRM and post-FIRM. All additions to a post-FIRM building must be elevated at least as high as the RFE in effect when the building was built. If a new, higher RFE has been adopted since the building was built, additions that are substantial improvements must be elevated to the new RFE.

A project is a substantial improvement if the cost of the improvement project divided by the market value of the building is greater than or equal to 50 percent. If the project is an addition, only the addition has to be elevated. If an applicant applies for a permit for only part of the job and later reapplies for another permit to finish the job and if both applications together are worth 50 percent or more of the value of the building, FEMA requires that the entire project be considered a substantial improvement.

A detailed cost estimate prepared by a licensed general contractor, professional construction estimator, or the community's office is needed to determine a substantial improvement. The estimate submitted by the permit applicant must be reviewed and verified for reasonableness. Building code valuation tables published by major building code groups, knowledge of local and regional construction costs, or professional judgment can be used for determining estimates for particular replacement items.

The value placed on labor should be equal to the actual or estimated labor charge for repair of all improvements/damages to the structure. Where non-reimbursed labor is involved, the value of the labor should be estimated based on applicable minimum-hour wage scales for the type of construction work that is done. This estimate should be made by the local permit official based on their professional judgement and knowledge of the local or regional wage scales for various types of construction work.

Items to include in calculating the cost of the project:

- All structural elements
  - Spread or continuous foundation footings and pilings
  - Monolithic or other types of concrete slabs
  - Bearing walls, tie beams, and trusses
  - Floors and ceilings
  - Decks and porches
  - Interior partition walls
  - Exterior wall finishes
  - Windows and doors
  - Reshingling or retiling a roof
  - Hardware

- All interior finishing elements
  - Tiling, linoleum, stone, or carpet over subflooring
  - Bathroom tiling and fixtures
  - Wall finishes
  - Kitchen utility and bathroom cabinets
  - Built-in bookcases, cabinets, and furniture
  - Hardware

- All utility and service equipment
  - HVAC equipment
  - Plumbing and electrical services
  - Light fixtures and ceiling fans
  - Security systems
  - Built-in kitchen appliances
  - Central vacuum systems
  - Water filtration, conditioning, and/or recirculation systems

- Cost to demolish storm-damaged building components

- Labor and other costs associated with moving or altering undamaged building components to accommodate improvements or additions

- Overhead and profits

Items to be excluded from calculating the cost of the project:

- Plans and specifications

- Survey costs

- Permit fees
- Post-storm debris removal and cleanup
- Outside improvements
  - Landscaping
  - Sidewalks
  - Fences
  - Yard lights
  - Swimming pools
  - Screened pool enclosures
  - Detached structures
  - Landscape irrigation structures

Market value is defined as replacement cost less depreciation. The market value of a structure reflects its original quality, subsequent improvements, physical age of the building components, and current condition. The market value for the property can be different than that of the building itself. The value of developed property varies widely due to the desirability of its location. For the purposes of determining substantial improvement, market value pertains only to the structure in question, not the land, landscaping, or detached accessory structures on the property. Acceptable estimates of market value can be obtained from an independent appraisal by a professional appraiser, detailed estimates of the structure's actual cash value, property appraisals used for tax assessment purposes with an adjustment recommended by the tax appraiser to reflect market conditions, the value of building taken from the NFIP claims data, and qualified estimates based on sound professional judgment made by the staff of the local building department or tax assessor's office.

3.4.1 Administration

In administering the substantial improvement regulations of the NFIP, the local floodplain administrator has several items to consider: 1) how to determine market value and 2) exceptions (refer to Section 3.6 for checklist).

1. *Determining Market Value.* The "substantial improvement" definition is straightforward--it is 50 percent of the market value of a structure. That means if a permit applicant's home could sell for $40,000 and he requests a permit to build an addition that will cost $30,000, then the "substantial improvement" definition is met and the floodplain ordinance regulations apply.

   The closer the level of improvement or damage appears to approach 50 percent of the market value of the structure, the greater the precision needed in determining substantial improvement. For example, if the damage sustained (or cost of full repair)

relative to market value is thought to be minor (less than 40 percent) or extensive (greater than 60 percent), then more approximate methods for determining substantial improvement may suffice. In contrast, if the ratio is suspected to be between 40 percent and 60 percent, then detailed, itemized estimates for the cost of repair and definitive estimates of market value must be used.

The easiest option a local administrator has to determine market value is to work closely with the community's tax assessor. State law assesses property taxes for residential and commercial structures assessed based on a percentage of their "true and full" value. "True and full" value is the same as market value. Generally, both the market value and the assessed value of a structure appear on a property tax statement and is public information. An administrator can determine market value by simply calling the community's assessor, providing a legal description, and asking for the value.

In some instances, the permit applicant may protest the market value assigned to the structure--stating it is either too high or too low. The applicant can be given the option of having the structure independently appraised. The permit applicant would assume the cost of the professional appraisal.

2. *Exceptions.* Cost of repairs required to remedy health, safety, and sanitary code deficiencies can be deducted from the overall cost of an improvement, but, only if 1) an appropriate regulatory official such as a building official, code enforcement officer, fire marshal, or health officer was informed about and knew the extent of the code related deficiencies and 2) the deficiency was in existence prior to the damage event or improvement and will not be triggered solely by the fact that the structure is being improved or repaired.

   In addition, for any repair required to meet health, sanitary, and safety codes, only the minimum necessary to assure safe living conditions should be deducted. Cost of repairs that are in excess of the "minimum necessary" for continued occupancy or use will be counted toward the cost of the overall improvement.

   Improvements to historical structures are excluded so that their historical significance will not be diminished. To determine whether or not a structure meets the "historical" definition (i.e., is listed on the National or State Inventory of Historic Places), a local administrator can contact the:

   Arizona Historic Preservation Society
   Arizona State Parks Department
   1300 West Washington
   Phoenix, Arizona 85007
   (602) 542-4009

3.5 Substantial Damage

Substantial damage, as defined in 44 CFR Section 59.1, means:

> "Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred."

This term includes damage from any cause, such as flood, fire, earthquake, wind, rain, or other natural- or human-induced hazard. This rule also applies to every building in a flood hazard area, regardless of whether or not the building was covered by flood insurance. The term does not include:

1. Any project for improvement of a structure to correct existing violation of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or

2. Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."

Substantial damage is calculated the same way as substantial improvement. The cost to repair is divided by the market value of the building and the result must be greater than or equal to 50 percent. The market values are estimated using the same method as the substantial improvements, only using the pre-damaged market value.

Notice that this formula uses the phrase "cost to repair" and not "cost of repair." The cost to repair the structure must be calculated for full repair to the building's before-damage condition, even if the owner elects to do less. It also includes the cost of any improvements that the owner has opted to include during the repair project. The total cost to repair includes the same items listed under Section 3.4.

Substantial damage is determined regardless of the actual cost to the owner. The true cost of bringing the building back to its pre-damage condition using qualified labor and materials obtained at market place must be estimated. The permit office and the owner may disagree over the total list of necessary repairs and their cost. The disagreements can be alleviated by getting the cost to repair from an objective third party. A third representative could be a licensed general contractor, professional construction estimator, insurance adjuster, building inspector, or community office. Other methods of settling disputes is to use an objective system that does not rely on varying estimates of market value or different opinions of what needs to be repaired, publicize the need for the regulations and the benefits of protecting buildings from future flooding, and help the owner find financial assistance to meet the extra cost of complying with the code.

Substantial damage requirements and exceptions are the same as for substantial improvements. If the structure is substantially damaged, it automatically becomes a substantial improvement and must be elevated (or floodproofed) at or above the RFE. Also, it must meet other applicable program requirements. Substantial improvement applies to all buildings located in special flood hazard areas regardless of the reason for the improvement or the cause of damage, except for those exemptions previously mentioned.

It is the community's responsibility to assure the accuracy of the improvement cost or actual repair/damage value and to obtain consistent market value estimates. FEMA has developed a software program to assist the communities in making substantial damage determinations. The software is a Windows-based program, and it comes with a manual titled "Guide on Estimating Substantial Damage Using the NFIP Residential Substantial Damage Estimator, FEMA 311." Contact the FEMA Regional Office for a copy of the software package.

For more information on substantial improvement and substantial damage, see Appendix J, "Questions & Answers - Substantial Improvement and Substantially Damaged Structures in Post-Disaster Situations."

3.5.1 Increased Cost of Compliance

Increased Cost of Compliance (ICC), included on Standard Flood Insurance Policies since June 1, 1997, requires that improvements or damage repairs to structures be permitted and tracked so that on a cumulative basis the improvements or repairs will not exceed 50 percent of the market value of the structure. FEMA will pay claims up to $15,000 to bring the structure into compliance with the minimum requirements of the NFIP if the structure has been repetitively or substantially damaged by flood. This coverage for repetitive damage is available only in communities that keep track of flood damage repair on a cumulative basis. Further details of ICC are discussed in Chapter 5, Section 3.

There are some limitations to ICC:

- It's only available if there was a flood insurance policy on the building before the flood.
- It covers only damage caused by a flood.
- Claims are limited to $15,000 per structure.
- Claims must be accompanied by a substantial damage determination by the floodplain ordinance administrator.

3.6 Sample Checklist for Determination of Substantial Improvement

This form was developed by FEMA Region IX for use in determining whether or not a permit application qualifies for Substantial Improvement. This is merely a sample, and it can be modified and conformed to meet the community's needs. This form must be permanently retained in a file for review.

Date of Evaluation: _____

Evaluator's Name: _____

Structure Address: _____

Owner's Name: _____

Mailing Address of Owner: _____

Telephone Number of Owner: _____

Permit Applicant's Name: _____

Mailing Address of Permit Applicant: _____

Telephone Number of Permit Applicant: _____

Final Determination:
Qualify for Substantial Improvement: Yes Γ or No Γ

To establish the "Market Value" take the replacement cost less depreciation of the structure. The initial review can be cursory to establish if the permit appears to qualify for substantial improvement criteria. If in the 40 percent to 60 percent range, a more detailed study is required to specifically determine the value of the structure. If the value does not reach the 40 percent level, the permit will not require meeting the substantial improvement criteria. Check "No" in the above box.

If the above calculation appears to meet the 40 percent to 50 percent criteria, complete a more detailed computation.

Detailed Computation: Market Value: $_____

Notes:

- Compute using square footage multiplied by the building valuation data in Building Standards determined by the Industrial Code of Building Officials.

- Do not include the non-structure improvements or values such as property value or fences, pools, landscaping, etc.

- Detached garages or outbuildings are not included but are treated as separate structures.

- Labor done by owner must be computed based upon normal labor and materials values.

Based upon the above calculations, the percentage figure for this permit improvement is the following:

_____ Percent of Market Value

(If 50 percent or greater, the structure is considered to be a substantial improvement and requires compliance with current community NFIP ordinance requirements. Check "Yes" in the above box.)

3.7 Granting of Variances, Appeals, Special Uses, Boards

A variance is a grant of relief by a community from the terms of land use, zoning, or building code regulation. Granting a variance should be rare because it can increase risk to life and property. Granting a variance is a local decision that must be based on the NFIP criteria as well as state law and other provisions within the community. If a variance is to be granted, the community must document all interactions with the applicant. Variances must be based on zoning laws that pertain to property and are not personal in nature. A variance is granted for a parcel with physical characteristics so unusual that complying with the ordinance would create a hardship to the applicant and/or surrounding property owners. The characteristics should be unique to the property and not shared by adjacent parcels, and it must pertain to the land, not to structures and its inhabitants. A community should grant a variance based on a structure by structure review, and a variance should not be granted for multiple lots and for subdivisions. It is recommended to contact the NFIP State Coordinator before granting any variance(s).

3.7.1 Hardship vs. Community Goals

In determining whether or not an applicant has established an exceptional hardship sufficient to justify a variance, the local board weighs the applicant's hardship against the purpose of the ordinance. In the case of variances from a flood elevation requirement, this would mean asking which is more serious: the hardship that this individual applicant would face or the community's need for strictly enforced regulations that protect its citizens from the dangers and damages of flooding. Only a truly exceptional, unique hardship on the part of an individual property would persuade local officials to set aside provisions of an ordinance designed with the whole community's safety in mind. The hardship might not have to be so severe if the applicant were seeking a variance to a setback ordinance, which was intended merely to simplify street repair and modifications. In the course of considering variances to flood protection ordinances, local boards continually must face the more difficult task of frequently having to deny requests from applicants whose personal circumstances evoke compassion but whose hardships are simply not sufficient to justify deviation from community-wide flood damage prevention requirements.

The hardship that would result from failure to grant a requested variance must be exceptional, unusual, and peculiar to the property involved (refer to 44 CFR ∋60.6 (a) (3) (ii)). **[Mere economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, physical handicaps, personal preferences or the disapproval of one's neighbors likewise cannot, as a rule, qualify as exceptional hardships.]**

According to the 44 CFR ∋60.6, the "procedures for the granting of variances by a community are as follows:

(1) Variances shall not be issued by a community within any designated regulatory floodway if any increase in flood levels during the base flood discharge would result;

(2) Variances may be issued by a community for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the procedures or paragraphs (a) (3), (4), (5) and (6) of this section;

(3) Variances shall only be issued by a community upon (i) a showing of good and sufficient cause, (ii) a determination that failure to grant the variance would result in exceptional hardship to the applicant, and (iii) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances;

(4) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief;

(5) A community shall notify the applicant in writing over the signature of a community official that (i) the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage and (ii) such construction below the base flood level increases risks to life and property. Such notification shall be maintained with a record of all variance actions as required in paragraph (a) (6) of this section; and

(6) A community shall (i) maintain a record of all variance actions, on file indefinitely, and (ii) report such variances issued in its annual or biennial report submitted to FEMA.

(7) Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that (i) the criteria of paragraphs (a)(1) through (a)(4) of this section are met, and (ii) the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety."

While the building standards in a local ordinance may be altered by means of a variance, the flood insurance purchase requirement, which must be enforced by lending institutions, cannot be waived and thus may create severe financial consequences for the property owners. Insurance rates for structures built below BFE are substantially higher than those for elevated structures. In many instances, the rates will be so high as to make the structure essentially

uninsurable because the owners cannot afford the premium. This may be immaterial to the original owner who applied for the variance in the first place. It may be significant to subsequent owners who must forego purchase of the property, cannot find buyers because of the high insurance rates, or to a community that has a large number of unsalable houses. In addition, if the property is not insured, there may be no funds available to repair the structure if a flood damages it. The local government and/or the holder of the mortgage are then left with the problem of one or more vacant, flood-damaged, and essentially uninsurable houses.

Because the duty and need of local governments to help protect their citizens from flooding is so compelling and the implications of the cost of insuring a structure built below flood level are so serious, variances from the flood elevation or from other requirements in the flood ordinance should be quite rare. It is recommended to contact the NFIP State Coordinator prior to the issuance of a variance.

3.7.2 Historic Buildings

A variance for a historic building can be requested and issued for the reconstruction, rehabilitation, or restoration of the historic structure if the variance is the minimum necessary to preserve the historic character and design of the structure. The historical structures pertain to structures that are listed in the National Register of Historic Places, the State Inventory of Historic Places, or contribute to a historic district.

A certified local historic board or a preservation officer must review the proposed remodeling and renovating plans before granting a variance. Any applicable measures that can be used to reduce future flood damage must be required.

3.7.3 Functionally Dependent Use

A functionally dependent use is defined as one that must be located or carried out close to water. This includes docking or port facilities necessary for the unloading of cargo or passengers. The following requirements must be met in order to receive a variance: there is good and sufficient cause for providing relief from the regulations, the variance will be the minimum necessary to provide relief, and the variance does not cause a rise in the BFE.

3.7.4 Records for Variance

The community must keep a record of all variances and the rationale for granting them. These are subject to review by FEMA and the NFIP State Coordinator during a CAV.

The records must include a copy of the written notification to the applicant that the issuance of a variance to construct a building not in accordance with the local floodplain management ordinance will result in increased flood insurance premium rates as high as $25 per $100 of coverage, and such construction increases risk to life and property.

It is recommended that the variance findings, conditions, and authorization be recorded in county deed records. This provides a means of permanently notifying future or prospective owners about the terms and conditions of the variance.

3.8 Record Keeping

Record keeping is an extremely important part of a community's responsibility when participating in the NFIP. The following records must be kept on file indefinitely and open for public inspection:

- A complete and updated copy of the floodplain ordinance, the FIS, and the FIRMs.
- Elevation certificates for all new or substantially improved structures in the SFHA. For floodproofed structures, floodproofing certification must be obtained and maintained.
- A copy of the permit application and all engineering data used to document a development's compliance with the NFIP and the state's floodway and encroachment standards, including inspection reports.
- A copy of engineering analysis submitted for LOMRs together with all pertinent correspondence relating to it.
- A copy of all engineering analysis and correspondence related to a watercourse alteration or flood control project that alters a watercourse.
- Subdivision proposals greater than 5 acres or 50 lots must include BFE data.
- A copy of the approved permit and copy of the certificate of occupancy.
- Copy of any appeals and/or variance proceedings.
- Copy of denial of floodplain use permit.
- Copies of biennial reports to FEMA, including copies of previous years reports, total permits and/or variances granted annually in the flood hazard area, census data, maps of community boundary changes, and records of any major natural or man-made changes affecting flooding patterns.

3.8.1 Elevation Certificates

There is no mandated form for keeping building elevation records unless your community is participating in the CRS. However, it is strongly recommended that a FEMA elevation certificate form be used to assure compliance.

The FEMA form is an eight-page packet. It includes the two-page FEMA Form 81-31, Elevation Certificate, and instructions on how to complete it. Additional copies of the packet are available in bulk at no cost by calling 1-800-638-6620, ext. 2 (customer service).

The responsibility for obtaining and filing an elevation certificate rests on the local permit official. Part or all of the form may be completed by a land surveyor, engineer, architect, or local official authorized by ordinance to provide floodplain management information.

The community may give property owners the responsibility of completing the elevation certificate. The permit official's responsibility is to verify all applicable entries are entered and to check for reasonableness This information must then be kept on file indefinitely.

3.8.2 Floodproofing Certificate

Floodproofing means making a building watertight or substantially impermeable to floodwaters. It is an option only allowed for nonresidential buildings.

Designs for a floodproofed building must account for flood warning time, uses of the building, mode of entry to and exit from the building and the site, floodwater velocities, flood depths, debris impact potential, flood frequency, and maintenance.

FEMA's Technical Bulletin 3-93, "Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas," has a detailed discussion on each of these considerations and is located in Appendix N.

For insurance rating purposes, the building's floodproofed design elevation must be at least one foot above the BFE to receive rating credit. If floodproofed only to the BFE, the floodproofing credit cannot be used, resulting in higher flood insurance rates.

44 CFR Section 60.3(b)(5) and (c)(4) require the community to obtain and maintain a registered professional engineer's certification that a nonresidential building was properly floodproofed. It is encouraged to use the one-page FEMA certification form because it fulfills NFIP insurance rating needs as well as floodplain management requirements.

3.8.3 Biennial Report

Every two years participating communities must complete a form describing the community's progress in the previous two years in implementing floodplain management measures (44 CFR 59.22).

FEMA sends the one-page form to the chief elected official. It must be completed and returned to FEMA within 30 days. The following information is requested:

- Changes in community boundaries.
- Physical or topographical changes that affect flood hazard areas.
- Amendments to your floodplain ordinance.
- The number of building permits issued in the floodplain.
- The number of variances issued.

Additional information includes:

- The number of people and number of buildings in the floodplain.
- Whether you would like any floodplain management assistance.

CHAPTER 4 – CONSTRUCTION IN SPECIAL FLOOD HAZARD AREAS

4.1 Building Characteristics

A building is defined, for floodplain management purposes, as a walled and roofed structure, including gas or liquid storage tanks, which is located principally above ground. Manufactured homes are also encompassed under this definition. This definition does not include open pavilions, bleachers, carports, or similar structures that do not have at least two rigid walls and a roof.

Residential and nonresidential buildings may have different building standards applied to them. For example, a residential building constructed in a floodplain must be elevated at or above the regulatory flood elevation (RFE); whereas, a nonresidential building may be either elevated or floodproofed at or above the RFE.

4.2 Elevation of Residential Structures

All new construction and substantial improvements of residential structures located within Zones A1-30, AE, and AH shall have the lowest floor, including the basement, elevated at or above the RFE.

Within any AO zone on the community's Flood Insurance Rate Map (FIRM) it is required that all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified). See figure 11.

One of the following methods can be used to elevate the structure:

- *Elevation on fill.* The National Flood Insurance Program (NFIP) regulations recommend the use of fill. Before fill is put in place, existing vegetation and any unstable topsoil must be removed. Usually, the placement of fill is limited to three or four feet in height. The fill should then be placed in layers not exceeding 12 inches deep, with layers compacted with pneumatic or sheepsfoot rollers or vibrating compacting equipment. For most residential applications, compaction to 95 percent of the maximum density obtainable with the Standard Proctor Test Method issued by the American Society for Testing and Materials (ASTM Standard D-698) is usually sufficient. Fill should also be sloped and protected from erosion and scour during flooding. Fill slopes should be no steeper than 1.0 foot vertical to 1.5 feet horizontal. It is recommended that the fill extend 15 feet beyond all sides of the structure.

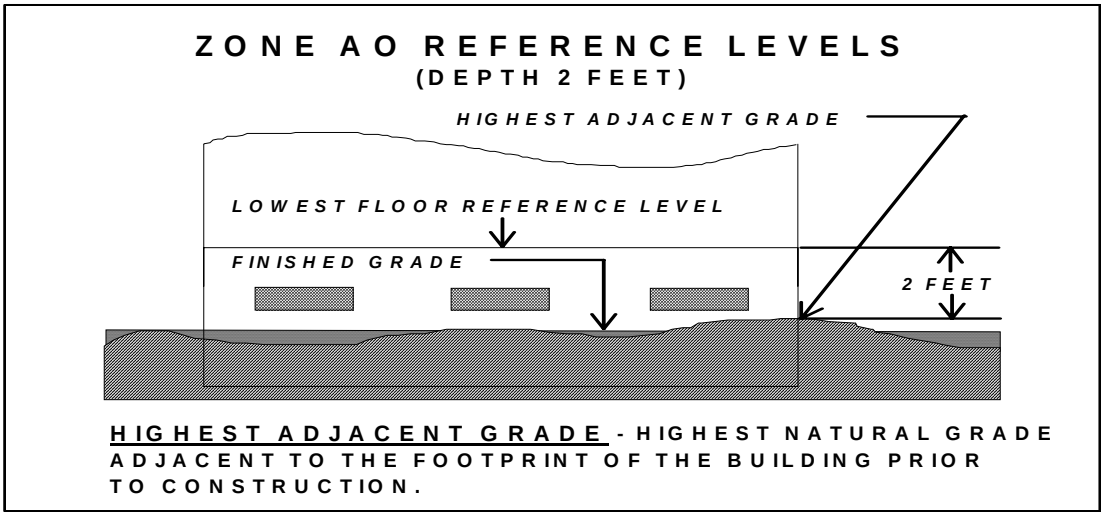


Figure 11: Zone AO reference levels for determining elevations

Restrictions may apply in cases where fill is placed in a floodway and could cause an increase in flood heights. Also, many communities also limit the use of fill in the flood fringe to protect flood storage capacity or required compensatory storage.

- *Elevation on piles, posts, piers, or columns.* This is a viable solution where there is deeper flooding and fill is not feasible. Key considerations for pile foundations are pile embedment method and depth, bracing to resist lateral forces, proper connections (foundation to floor beam, floor beam to floor joist, floor joist to wall, and wall to roof). Enclosure of the lower area is not recommended especially where flooding may have high velocities or create waves.

- *Elevation on walls or an addition of a crawlspace.* This technique involves building onto solid walls. In shallower flooding areas, a crawlspace can be added to create a foundation of solid walls that raises the lowest floor above the flood level. When building these walls, hydrostatic or hydrodynamic pressure can be avoided by using stem walls and/or by having large openings in the walls. Stem walls can be used on two sides parallel to the flow of water and keeping the other two sides open. This procedure minimizes the obstruction of floodwaters and lessens the foundation pressures. The large openings in the walls allow floodwater to flow through, preventing differential pressures on the walls. The walls are usually limited to three or four feet in height above grade. All designs must be certified by a registered engineer or architect or meet or exceed the minimum opening criteria.

Figure 12: The 1993 flood event looking across the Verde River at an elevated building in Cottonwood, Arizona

For more information, refer to the following FEMA technical bulletins: "Free of Obstruction Requirements," FIA-TB-5, April 1993 and "Elevated Residential Structures," FEMA-54, March 1984.

4.2.1 Lowest Floor

The lowest floor is defined as the lowest enclosed area, including the basement. An unfinished or flood-resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor, provided that such enclosure is not built to render the structure in violation of the applicable non-elevation design requirements of the ordinance. This definition is important because the flood risk and compliance of the structure with the NFIP standards is determined by the reference level of the lowest floor in relation to the base flood elevation (BFE). Figure 13 contains diagrams depicting some examples of what is considered to be the lowest floor elevation.

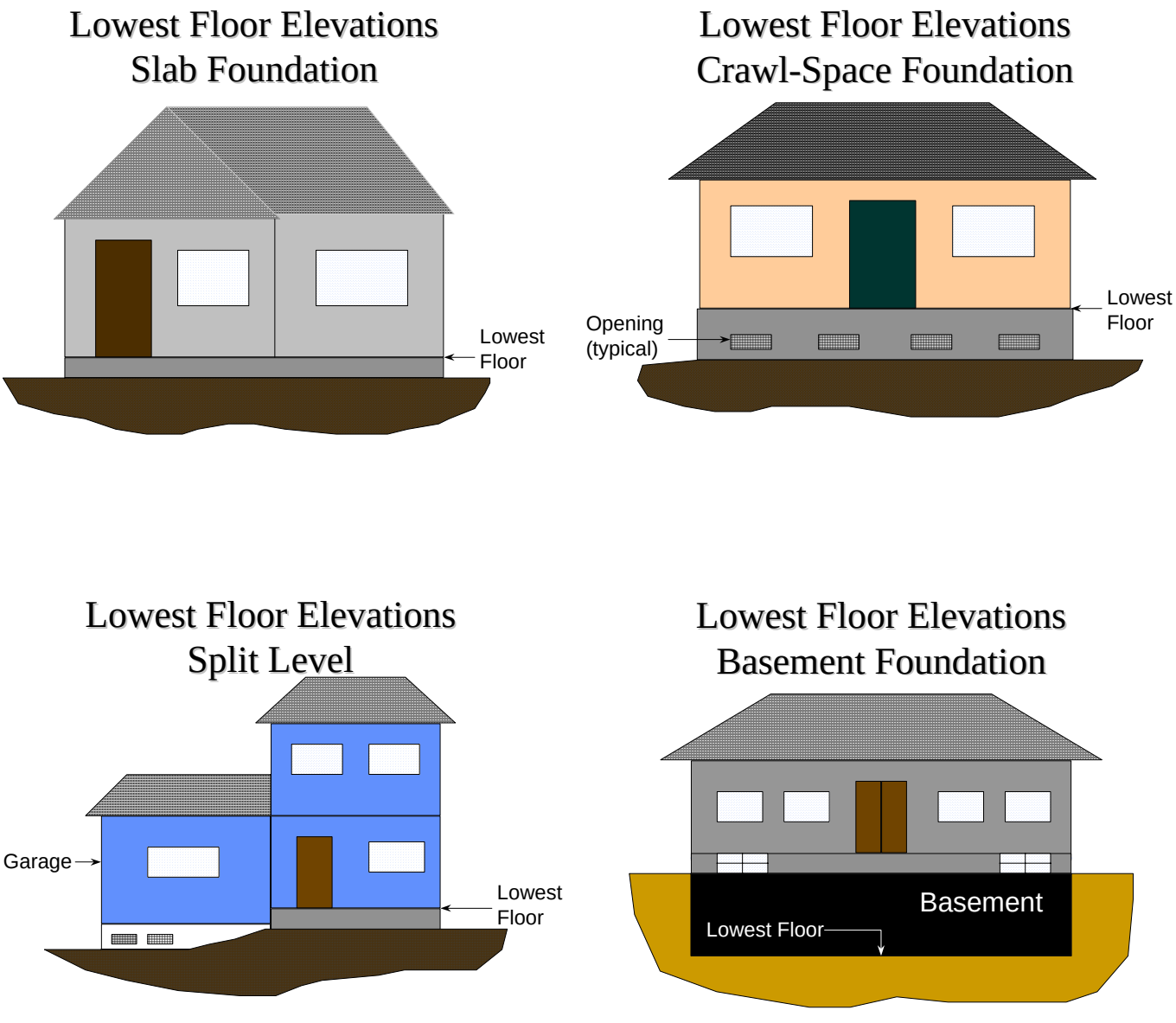


Figure 13: Lowest Floor Elevation Diagrams

4.3 Enclosures Below the Regulatory Flood Elevation (RFE)

Enclosures are the areas created by a crawlspace or solid wall below the RFE. The walls of enclosed areas are subject to flood damage from hydrostatic and hydrodynamic forces. One of the problems often associated with enclosures is that people can be tempted to convert enclosures below the RFE into areas that can sustain damage in a flood. However, the NFIP regulations allow certain uses such as building access, vehicle parking, and storage in enclosures below the RFE only if openings are installed to allow the entry and exit of floodwaters.

Utilities that serve the building must also be protected from flood damage. Consequently, a furnace cannot be put in an enclosure unless it is above the RFE. This is explained in more detail in *Engineering Principles and Practices for Flood Damage-Resistant Building Support Utility Systems* and can be ordered by contacting the Federal Emergency Management Agency (FEMA) Publication Office at 1-800-480-2520.

For enclosures below the RFE, flood resistant materials must be used. Finishings such as carpeting, paneling, insulation (both cellulose and fiberglass), and gypsum wallboard (also known as drywall and sheet rock) must also be used.

4.3.1 Openings

Enclosures below the RFE and used solely for parking vehicles, building access, and storage must have openings that allow floodwaters to enter and exit. This prevents solid walls from collapsing by equalizing the hydrostatic flood forces on the walls.

In order to ensure the openings are properly installed, FEMA requires that the builder have the design certified by a registered professional engineer or architect or have the design meet the following criteria:

- Bottom of openings no higher than one foot above the adjacent grade.
- There must be a minimum of two openings on different sides of each enclosed area. If a building has more than one enclosed area, each area must have openings on exterior walls to allow floodwater to directly enter and exit.
- A minimum of two openings must have a total net area of not less than one square inch for every square foot of enclosed area that is subject to flooding.

The openings can be covered with screens, louvers, or other automatic devices in order to keep animals and large debris out of the enclosures, providing that the coverings permit the flow of floodwater to enter and exit without human intervention. The opening sizes are based on standard crawlspace vents, which most building codes require to be installed for ventilation purposes. The size of the openings typically meets both the NFIP requirements and building code ventilation requirements. Garage doors cannot be used to satisfy this requirement because they inhibit the flow of floodwaters, unless the door has appropriately sized and located vents.

Figure 14: Elevated building with openings

For more information on openings, refer to FEMA's Technical Bulletin 1-93 "Openings in Foundation Walls for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program" in Appendix N.

4.4 Basements

The term basement means any area of the building having its floor below ground level on all sides. Because they are subgrade on three sides with the downhill side at or above grade, walkout basements, daylight basements, or terrace levels are not considered basements for either floodplain management or flood insurance rating purposes; however, they are considered as the lowest floor of a building for floodplain management and insurance rating purposes. If these areas are used only for parking, access, or storage and they meet other ordinance requirements, they can be regulated as enclosures below an elevated building and not considered to be the lowest floor.

4.5 Subdivision Developments

A subdivision is considered a large development that is greater than 5 acres or 50 lots. The community must review subdivision proposals and other new developments including manufactured home parks or subdivisions. If a subdivision proposal or other proposed new development is located in a floodprone area, the proposal must be reviewed to assure that it is consistent with the need to minimize flood damage within the area, all public utilities and facilities are located and constructed to minimize or eliminate flood damage, and adequate drainage is provided to reduce exposure to flood hazards. Subdivision proposals must include the BFE data, i.e., a detailed study of the flood hazard. The detailed study should follow FEMA guidelines and specifications. For information on study guidelines, see "Flood Insurance Study – Guidelines and Specifications for Study Contractors" (FEMA 37, January 1995). Once the detailed study is complete, the applicant should revise the FIRM, i.e., obtain a Letter of Map Revision from FEMA.

Figure 15: Apartments located in Tucson, Arizona, collapsing due to erosion caused by flooding

4.6 Floodproofing Nonresidential Structures

The NFIP regulations allow nonresidential buildings (commercial structures, garages, warehouses, etc.) the option to floodproof rather than elevate as a means of protection from the base flood. Floodproofing requirements include:

- Nonresidential construction, new or substantial improvement, must be floodproofed at or above the RFE so that the structure is watertight with walls substantially impermeable to the passage of water;

- The structural components must be capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and

- The structure design must be certified by a registered professional engineer or architect that the above standards are satisfied.

For flood insurance purposes, floodproofing must be in-place and require no human intervention to be effective.

There are two types of floodproofing, depending upon the nature of the facility to be protected: 1) wet floodproofing, which allows water to enter the structure with little or no damage and 2) dry floodproofing, which prevents floodwater from entering the facility up to a specified elevation.

Wet floodproofing may be used where the structure itself would sustain little or no damage from a flood and the uses of the facility can be protected from damage. This must be in compliance with FEMA's Regulations for Floodplain Management, 44 Code of Federal Regulations (CFR) ∋60.3 (c)(5). Wet floodproofing allows floodwaters to enter and exit the structure by design and to equalize the water pressure on the inside to the water pressure on the outside. Utilities must be raised to one foot above BFE so that after a flood only minimal cleanup and repair is necessary. Before the floodplain permit can be issued, the floodproofing must be certified by a registered professional engineer or architect or it must have a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding and the bottom of all openings must be no higher than one foot above grade.

Dry floodproofing consists of designing the structure to prevent seepage, collapse, cracking of walls, buckling of floors, and back up from sewer lines. Walls and floors must be capable of withstanding hydrostatic pressure and all openings must be located at least one foot above BFE. The building must have sufficient weight to resist floatation. Dry floodproofing may involve placing a dike or berm entirely around a property or constructing a building with impermeable walls to one foot above the BFE. This method of floodproofing must be certified by a registered professional engineer, and the information pertaining to the project must be maintained in the community's files. Dry floodproofing measures are recognized by the NFIP for flood insurance purposes (lower premium rates); other types of floodproofing are not. It is important to note that **residential structures may not be floodproofed--elevation is required.**

For more information, refer to Appendix N for the following FEMA Technical Bulletins: "Non-Residential Floodproofing – Requirements and Certification for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program," FIA-TB-3, April 1993; "Below-Grade Parking Requirements for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program," FIA-TB-6, April 1993; "Floodproofing Non-Residential Structures," FEMA 102, May 1986; and "Wet

Floodproofing Requirements for Structures Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program," FIA-TB-7, 1993.

4.7 Flood-Resistant Materials

All parts of a building exposed to floodwaters must be constructed of flood-resistant materials. Flood-resistant materials include building products that can withstand direct and 72 hours of contact with floodwaters without sustaining damage that requires more than low-cost cosmetic repair. Some common types of flood-resistant materials are listed below:

- Concrete, concrete products, glazed brick
- Clay, ceramic tile
- Galvanized or stainless steel nails, hurricane clips, connectors
- Indoor-outdoor carpeting with synthetic backing
- Vinyl, rubber
- Metal doors and window frames
- Polyester-epoxy paint
- Stone, slate, or cast stone
- Mastic, silicone, polyurethane flooring
- Water resistant glue
- Pressure treated or naturally decay resistant lumber

FEMA's Technical Bulletin 2-93 "Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program" discusses the types and applications of flood-resistant materials, and this bulletin can be referred to in Appendix N.

4.8 Accessory Buildings

Detached garages, boathouses, small barns, and storage sheds are some examples of accessory buildings. These buildings may not have to be elevated or dry floodproofed if openings are installed to allow floodwaters to enter or exit a structure and meet all other wet floodproofing requirements. Wet floodproofing requires the use of flood-resistant materials below the RFE and elevating items subject to flood damage above the RFE.

4.9 Manufactured Homes in a Floodplain

44 CFR 59.1 defines a manufactured home as "a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities." The term "manufactured home" does not include a "recreational vehicle."

There are specific requirements for manufactured homes installed in 100-year floodplains. All manufactured homes must be elevated on a permanent foundation such that the bottom level of the structural frame and attached appliances is elevated at or above the RFE and be securely fastened to an adequately anchored foundation system to resist floatation, collapse, and lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. Some examples of tie-down methods are shown in Figure 16. Manufactured homes located in these areas must either have the lowest floor elevated at or above the RFE and anchored to a permanent foundation system, or the manufactured home chassis must be supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade.

FEMA Publication 85 "Manufactured Home Installation in Flood Hazard Areas" describes the various anchoring methods, utility connections, wind loads, etc, and this publication can be obtained by contacting:

FEMA's Publication Office
FEMA Distribution Center
P.O. Box 2012
Jessup, MD 20794

The installation of manufactured homes in Arizona is regulated by the Office of Manufactured Housing. Installation standards have been adopted by that office and permits are issued accordingly. **Floodplain information is not checked by the installer.** Many times floodplain administrators discover manufactured homes installed within their jurisdiction without a floodplain permit. Usually, these installations are not elevated nor tied down in compliance with local floodplain management ordinances. The purchasers of manufactured homes are not informed of the requirement to obtain local permits prior to placing their homes. In many jurisdictions, the placement is not inspected by the local building inspector. The Office of Manufactured Housing inspects the installation and as long as it is in compliance with their installation standards, it is approved.

Some jurisdictions that do not inspect manufactured home installations have made arrangements with their local utilities to not allow occupancy until the local permitting officials approve the installation. At that point, the installation has been completed and the utilities are connected. If the unit is in the floodplain, the local official must then advise the homeowner that the unit must be elevated so that the bottom of the structural frame and any attached appliances is one foot above the 100-year flood elevation. The homeowner will then have to pay to have the unit elevated and reinstalled.

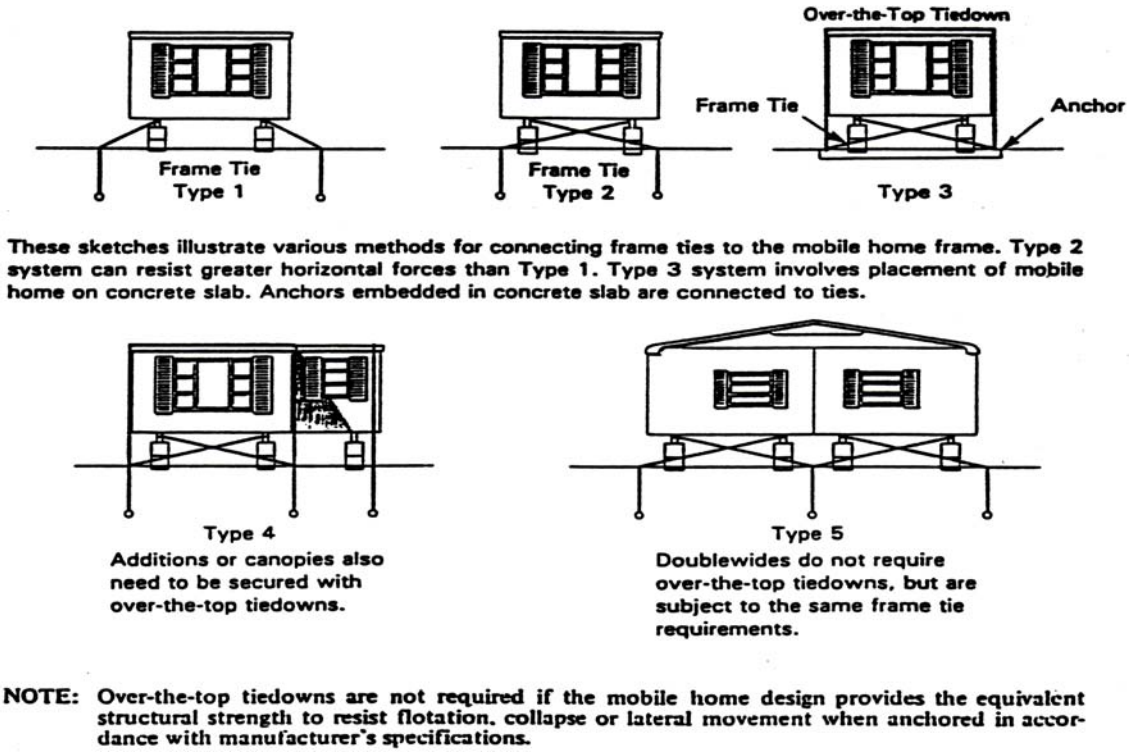


Figure 16**:** Mobile Home Tie-downs Required for Flood Insurance

4.10 Recreational Vehicles

A recreational vehicle is defined as a vehicle built on a single chassis, 400 square feet or less when measured at the largest horizontal projection, designed to be self-propelled or permanently towable by a light duty truck, and designed primarily not for use as a permanent dwelling but as temporary living quarters. A recreational vehicle situated on a site located in a SFHA must meet the elevation and anchoring requirements for manufactured homes, be on site for fewer than 180 consecutive days, or be licensed and ready for highway use. "Ready for highway use" means that it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities, and has no permanently attached additions.

4.11 Standards for Utilities and Building Systems

All new construction and substantial improvement shall be constructed with electrical, HVAC, plumbing, and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

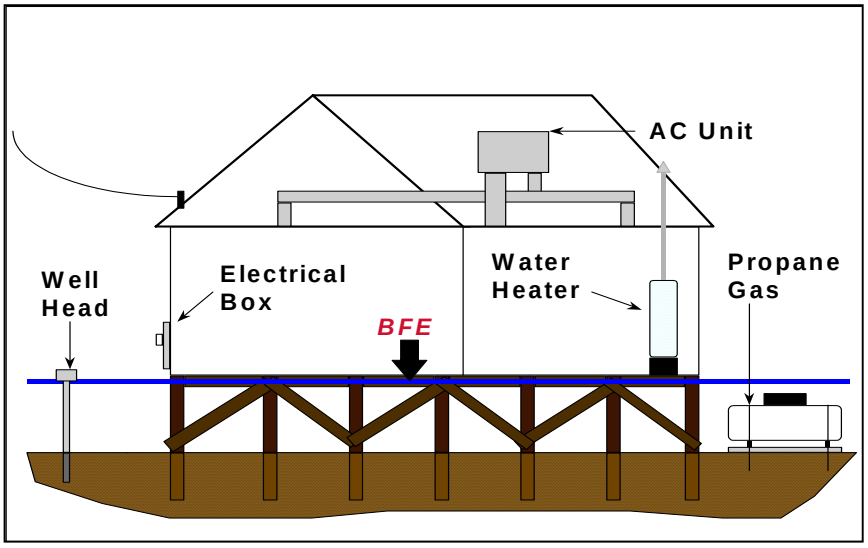


Figure 17: Utility location schematic

4.12 Water and Wastewater Systems

The community must require new and replacement water supply systems within floodprone areas to be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters. Location and design of onsite waste disposal systems should be reviewed in order to prevent possible impairment to the system and potential contamination to the system as well as to the environment during flooding.

The system should be protected from flood damage and it should be able to be used after the flood recedes. Manholes should be raised above the 100-year flood level or equipped with seals to prevent leakage. Pumping stations should have electrical panels elevated above the BFE. Waste disposal systems should be located to ensure they are accessible during a flood and designed to not release contamination in a flood event. An automatic backflow valve should be installed to prevent sewage from backing up into the building during flooding.

For more information on constructing water and wastewater systems, contact the following agencies:

U.S. Environmental Protection Agency
Water Division
75 Hawthorne Street
San Francisco, California 94105-3901
(415) 744-2125

Arizona Department of Environmental Quality
Water Quality Division
3033 North Central Avenue
Phoenix, Arizona 85012
(602) 207-2303

For more information on drilling a well, contact the following agency:

Arizona Department of Water Resources
Groundwater Management Division
500 North Third Street
Phoenix, Arizona 85004
(602) 417-2470

CHAPTER 5 - FLOOD INSURANCE

5.1 Flood Insurance Policies

The National Flood Insurance Program (NFIP) coverage is available to all owners of insurable property (a building and/or its contents) in a community participating in the NFIP. Owners and renters may insure their personal property against flood loss. Builders of buildings in the course of construction, condominium associations, and owners of residential condominium units in participating communities all may purchase flood insurance.

Condominium associations may purchase insurance coverage on a residential building, including all units, and its commonly-owned contents under the Residential Condominium Building Association Policy (RCBAP). The unit owner may separately insure personal contents as well as obtain additional building coverage under the Dwelling Form as long as the unit owner's share of the RCBAP and their added coverage do not exceed the statutory limits for a single family dwelling. The owner of a nonresidential condominium unit may purchase only contents coverage for that unit.

Flood insurance policies are obtained through local property insurance agents. The agents may sell a policy through one of the "Write Your Own" insurance companies or a direct policy through the Federal Emergency Management Agency (FEMA). These two approaches result in the issuance of a "Standard Flood Insurance Policy" that meets all FEMA requirements and rates. If an insured property is flooded, the property owner will contact their insurance agent; they do not need to deal with FEMA.

Flood insurance coverage is provided for insurable buildings and their contents. The building coverage is for the structure and includes all permanent fixtures that stay with the building when it changes ownership such as utility equipment, wall to wall carpeting, built in appliances, and wallpaper/paneling.

Under the insurance policy, the term "building" is defined as a walled and roofed structure. Manufactured homes that are above ground and affixed to a permanent site are also considered buildings under this definition as well as buildings in the course of construction, alteration, or repair. The following items are not encompassed under this definition:

- gas or liquid storage tanks
- structure with more than 50 percent of its value underground (wells or septic tanks)
- tents
- tennis and swimming pool bubbles
- swimming pools
- fences
- docks
- driveways

- open pavilions
- carports
- sheds on skids
- licensed vehicles
- building declared in violation with state or local law
- landscaping
- crops

Contents coverage is available for removable items inside an insurable building. This type of coverage is available to renters even if there is no structural coverage. Items in a structure that are not insurable:

- animals and livestock
- licensed vehicles
- personal possessions valued more than $250
- money or valuable papers

Limited coverage is offered for basements. Building coverage is not extended to wallpaper, carpeting and similar finishings. Coverage is available for the following items that are only kept in a basement:

- washers
- dryers
- freezers
- sump pumps
- well-water tanks
- oil tanks
- furnaces
- hot water heaters
- clothes washers and dryers
- air conditioners
- electric junctions
- circuit boxes

Limited coverage is also offered for enclosures below the lowest floor of an elevated post-Flood Insurance Rate Map (FIRM) building. Contents coverage is not available for enclosures, only structural coverage is required for utility connections and for the foundation and anchoring systems to support the building.

The amount of coverage for all buildings is based on a two-tier system: 1) basic layer of coverage and 2) an additional layer of coverage. The table on coverage amounts is for communities in the Regular Phase as of October 1, 1997.

Table 2: Regular Phase Coverage Amounts[1]

BUILDING COVERAGE	BASIC INSURANCE LIMITS	ADDITIONAL INSURANCE LIMITS	TOTAL INSURANCE LIMITS
Single-family Dwelling	$50,000	$200,000	$250,000
2-4 Family Dwelling	$50,000	$200,000	$250,000
Other Residential	$150,000	$100,000	$250,000
Nonresidential	$150,000	$350,000	$500,000
CONTENTS COVERAGE			
Residential	$20,000	$80,000	$100,000
Nonresidential	$130,000	$370,000	$500,000

[1] These rates verified on July, 2000.

A 30-day waiting period follows the purchase of a flood insurance policy before it goes into effect. This waiting period is to encourage people to keep a policy at all times and for everyone at risk to pay their share of premiums.

5.2 Lender's Responsibilities

The lender is responsible for making the "determination" of whether or not the borrower's "structure" is located in the floodplain. This is most often accomplished by hiring a "flood determination company" to assess the situation.

5.2.1 Mandatory Flood Insurance Purchase Requirements

The Flood Disaster Protection Act of 1973 mandates that flood insurance must be secured at the time of origination, extension, or renewal of a loan secured either by improved real estate or a mobile home in a Special Flood Hazard Area (SFHA). This applies to loans made by federally regulated, supervised, or insured financial institutions. The National Flood Insurance Reform Act of 1994 clarifies the law to specify that flood insurance is required for the life of the loan or as long as the collateral property is determined to be in a SFHA. It also establishes a mortgagee's or mortgage servicer's obligation to required the purchase of flood insurance at origination or at any time thereafter during the life of the loan when the institution determines that the improved property or mobile home is located in an area having special flood hazards. The only exception to these requirements is for loans of $5,000 or less which will be repaid in a year or less. Federal agency lenders which make direct loans secured by improved real estate, e.g., Small Business Administration, must adopt similar regulations.

If a lender is required to maintain an escrow account for the loan for any other purpose, flood insurance premiums will be escrowed. This will assure the lender that property owners, believing that they will not be flooded, will not simply stop paying the flood insurance premiums.

It is the lender's responsibility to determine whether the collateral property is in a SFHA and to notify the borrower. Within 45 days of notification, the borrower is to provide flood insurance coverage on the property. If the borrower does not, the lender may place the flood insurance coverage and charge the borrower's escrow account with the premium. This is referred to as force-placed flood insurance and the characteristics of the individual collateral properties are not taken into account. For example, if a property is elevated a foot or more above base flood elevation (BFE), credit is not given in the force-placed flood insurance premium rates. The individual property owners must obtain the appropriate certification of elevation for flood insurance purposes and provide it to their insurance agents to obtain the appropriate credit. It is in the property owner's best interest to place their own flood insurance.

If the lending institutions fail to require flood insurance on SFHA properties, they will be assessed a penalty of $350 per loan, up to $100,000 annually. Penalties will be assessed only on institutions in which a pattern of non-compliance is evident and the fines will be deposited in the Mitigation Fund. FEMA's memorandum on the next page provides more information and guidance on this particular subject.

Federal Emergency Management Agency
Region IX
Building 105
Presidio of San Francisco
San Francisco, California 94129

July 28, 1998

I e.

MEMORANDUM FOR: NFIP COMMUNITY FLOODPLAIN MANAGERS

FROM: Community Mitigation Programs Branch

SUBJECT: SUGGESTED COMMENT FOR HANDLING CONSTITUENT CALLS REGARDING AN INSURANCE REQUIREMENT

The following is suggested guidance for providing a "definitive" explanation regarding obtaining an exemption from the insurance requirements. While this explanation is long, it is designed to clarify what should be given to the caller.

FYI:

If the call centers on having their structure removed from the flood insurance requirement, the following comment should be provided. It is detailed, but designed to give them the necessary information to understand and deal with their issues.

Lenders make determinations, not FEMA

The lender is responsible for making the "determination" of whether or not the borrower's "structure" is in the floodplain. Most accomplish this by hiring a "flood determination company" to assess the situation. Unfortunately, these companies sometimes use a parcel map superimposed over a flood map to reach their conclusion, and render an opinion based upon the "parcel" being in a floodplain, as opposed to the "structure," which is what the law states must be considered.

Buying Insurance

If the lender has advised the borrower that they must obtain insurance, the lender has the authority to place coverage on the collateral for their loan (structure), if they do not obtain insurance. If the lender "force places" insurance on their property, they most likely will be obligated to pay premiums that are significantly higher than if the borrower takes out the policy themselves. Borrowers are encouraged to obtain their own insurance, available from any agent, in the amount of the loan or $250,000, whichever is less. If they succeed in having the requirement for insurance removed, they can obtain a refund of the balance of the premium year from the date of the LOMR or removal of the insurance requirement; or, in the case of a LOMA, they may receive a refund of the full premium year. Suggest that they contact their insurance agent for assistance in this matter.

First option to consider:

- obtain proof of determination

If the borrower believed their structure is outside the floodplain on a "horizontal" perspective, their first action might be to request the lender provide them the "specific evidence" that the "structure" is in the floodplain rather than the parcel. If the lender shows evidence that the structure is in, they are probably going to have to obtain insurance. Their only alternative is to hire a surveyor or licensed engineer to prove that the structure is not in the floodplain. (See below.) If the lender doesn't show the structure in, there is no requirement and their work is completed.

Please note that the lender will, in most cases, not accept a letter from the community stating that the structure is not in the floodplain. The community can, however, send the constituent a letter stating that the structure is not in the SFHA. If that is the case and if it is signed by a licensed surveyor or engineer, the letter can serve as the primary document for a Letter of Map Revision/Amendment (LOMR/LOMA), which can be sent to FEMA, along with an application.

If the first option doesn't work or doesn't apply:

- three official ways to remove the requirement

There are three basic ways to qualify for having a structure removed from the flood insurance requirement. The **first** is that the community has completed work on some flood/drainage/etc. improvements that would affect the structure and result in a change to the flood maps. The constituent should call their community floodplain manager, usually found in the building, planning, or community development department of the local government. If they are in an unincorporated area, they should call the appropriate county office. The telephone numbers are in the telephone book.

The community has a requirement to advise FEMA of such changes within six months of their becoming aware or completing any work or conditions that would result in a change to the floodplain map. If they have not done this, they should do so and provide the constituent a copy of the map change. It is issued in the form called a LOMR. This is a process for formally changing the flood map, and notice is provided anyone that obtains maps on a recurring basis.

If a LOMR was issued, the borrower should obtain a copy and provide a copy to the lender. The community should have a copy of all LOMR/LOMAs that have been issued for each panel of the community's maps. This may solve the problem. The LOMA/LOMR must state that their particular structural location is within the boundaries of the work justifying the LOMA/LOMR. If the work is still being done, they must wait until it is completed, at which time they can obtain the LOMA/LOMR, and request a release from their insurance obligation from the lender. They should buy insurance now for the interim period.

The **second** condition is if there is a definable, measurable distance between the four corners of your structure and the edge of the floodplain, the borrower has grounds for removing the insurance requirement. This is again on a "horizontal" plane basis. This is verified by a surveyor or licensed engineer determining the "metes and bounds" distance between the floodplain and the structure, and providing that information to FEMA. This information can <u>also</u> be the basis for requesting FEMA to render a determination under a "new option" available to borrowers needing a determination. (See below.) If a LOMR is desired, the borrower should have an elevation certificate completed by the surveyor/engineer and forward that with the additional requested information and the LOMR application to FEMA. A decision will be rendered within 30-45 days of receipt of all necessary information, and an answer provided to them.

There are fees involved with a LOMR application, where with a LOMA, there are not. This is because with a LOMA FEMA is "correcting" a map error rather than "changing" a map as a result of new construction, fill, etc. The fee schedule varies but is generally in the area of $400.00 for a single lot LOMR.

If they are successful and are sent a "LOMR" from FEMA, borrowers should send a "copy" to their lender requesting a release from their insurance requirement. The lender should issue a "letter of release" to them. The borrower should take that letter to their insurance agent and request them to cancel their insurance coverage. They can obtain a refund of any remaining balance on the yearly premium based upon the date of the LOMR. Tell them to keep the LOMR letter from FEMA with their important papers or with your title information, as it might be needed in the future, for example, at the time of sale of their structure.

The **third** condition is more of a "vertical" plane basis. If the structure is located on ground above the floodplain (for example, if the floodplain encroaches on part of the property but is below the structure), this may qualify the owner for an exemption. The important thing in this case is that the "adjacent grade," where the dirt comes to the foundation, must be "at or

above" the flood level shown on the map. Again, they will submit it with a LOMR/LOMA application to FEMA.

It is important to note that this third condition is not recognized by the lender as grounds for their making a decision to remove the insurance requirement. FEMA must issue a LOMA/LOMR letter for the lender to remove the insurance requirement in instances as cited above.

- new option

FEMA has initiated a new option that offers an opportunity to challenge the lender's determination. This process, for a fee of $80, requires both the borrower and the lender to submit their respective evidence to FEMA at which time it will render an opinion based upon the evidence received. This submission, though, must be sent to FEMA within 45 days of notification of the requirement for insurance coverage. This option is completely separate from the LOMA/LOMR process and has nothing to do with it. There must be adequate and technically sufficient evidence for them to render an opinion, and they will return a "no decision" opinion if the evidence is not sufficient. (The fee will not be returned!) This system is designed to avoid the use of the LOMA/LOMR process where it is not the appropriate option for resolution of the problem.

These options are the basic solutions to the most commonly found inquiries from citizens. We encourage you to conduct further discussions with your constituents in pursuit of resolution of the issue. If you have further questions, call your individual program manager at the FEMA Region.

5.2.1 Flood Hazard Determination Companies

There are organizations that contract with lending institutions to determine whether property being considered for a mortgage is in the SFHA. These flood hazard determination companies are located throughout the country and provide nationwide service to mortgage companies and mortgage servicing companies. They obtain FIRMs from FEMA and, at the request of mortgagees, provide flood zone information. While most of these determinations are accurate, there are instances in which incorrect determinations are made.

FEMA's instructions on the following pages outline the procedures that communities can take to verify the location of the structure.

Federal Emergency Management Agency
Region IX
Building 105
Presidio of San Francisco
San Francisco, California 94129

July 9, 1993

PROPERTY THAT IS NOT IN A SPECIAL FLOOD HAZARD AREA

The Flood Disaster Protection Act of 1973 requires Federally Regulated lenders and Federal Agencies that provide loans or assistance on improved real estate to make flood map determinations on those properties before the loan or assistance is provided. The mandatory flood insurance purchase requirements apply only where the building, mobile home or personal property that secures the loan or relates to the financial assistance, is located in a special flood hazard area.

You may wish to verify the flood map determination made by your lender. This can be done by contacting your local government agency that has a set of the Flood Insurance Rate Maps available for public viewing. You can ask their assistance in determining the exact location of your property and insurable building on that map. If your building is in a special flood hazard area flood zone designations that begin with the letter A or V), the lender's original map determination is correct and flood insurance will be required. You can then ask your community official if they have obtained a Letter of Map Revision from the Federal Emergency Management Agency (FEMA) that removes your property from the special flood hazard area. The community should request such a letter if there have been flood control improvements or other changes that have been made and the community has obtained a Letter of Map Revision from FEMA, you should provide a copy of that letter to your lender along with any supplemental information needed to show that your property is included in that Letter of Map Revision.

If your inspection of the Flood Insurance Rate Map with the community official shows that your lot or structure is not in a special flood hazard area and is located in flood zone B, C, X, or D, you should take the following steps to demonstrate your flood zone status:

a) Obtain from the community officials a photocopy of the portion of The Flood Insurance Rate Map (FIRM) that shows your property and the flood zone location, and a copy of the legend with the map scale. Also, obtain a photocopy of the title block for the map showing the community name, map panel number and date. Indicate the location of the property and building on this map.

b) If the FIRM does not show the street that the building is on, or shows the street but does not name it; a copy of a detailed local street map, including the map scale, should be provided. Indicate the location of your property on this map.

c) Obtain a copy of the tax assessors parcel map, including the scale, which shows the lot in question along with the adjacent lots and streets. Indicate the location of the property on this map.

Submit these maps for review by your lender. In most cases, this will be enough additional information to allow them to refine the original map determinations. If you can demonstrate that your entire property (which will include the insurable buildings) is not in a special flood hazard area there is no Federal requirement on your lender to have you purchase flood insurance. Please note that a lender can, on their own, decide to require flood insurance as a condition of the loan regardless of where the building is located. However, most lenders normally do not exceed that stated Federal requirement.

It is <u>not</u> necessary to ask the local officials to provide a "statement" that the property is not in a special flood hazard area. The lender must make the final determination based on the detailed maps and related evidence that is provided. Local officials can often provide copies of sections of detailed maps that can help you and your lender identify the exact location of your property.

PROPERTY THAT IS PARTLY IN A SPECIAL FLOOD HAZARD AREA

Even though a portion of the real property on which the structure (building or mobile home) is located may lie within a special flood hazard area, the mandatory flood insurance requirements of the Act do not apply unless the structure itself or some part of the structure is in a special flood hazard area. Therefore, the lender must make a food faith effort to determine whether or not the structure is in a special flood hazard area. In some cases, the lender may not have maps that show the exact location of the building on the lot and may automatically require flood insurance if part of the lot is in. If you can clearly demonstrate that the building is not in a special flood hazard area on the FIRM, using suitable detailed third party documents, the lender will not be obligated to require flood insurance. Please note that the lender can only use the maps to evaluate the horizontal (or flat) distance shown on the FIRM. The lender cannot consider the elevation of the ground or building. Ground elevations can only be evaluated by FEMA as described in the last paragraph.

In addition to the information outlined in parts a), b), and c) above, the type of detailed documentation you can provide to your lender to show the exact building location on the lot includes any one or more of the following:

- A copy of a subdivision, contour or other detailed map (prepared by a qualified professional) obtained from Community officials or developers that shows the lot

boundaries, building footprint and location of the streets with a map scale and physical features to allow comparison with the FIRM.

- In those cases where the building is a considerable distance from the special flood hazard area boundaries in terms of the scale on the FIRM, an aerial photo can be used. The photo must show the building, lot and tow or more physical features that appear on the FIRM and can be used at the discretion of the lender. This is only suitable where a gross difference is apparent because many aerial photos are taken at an angle that distort distances. Only rectified "orthophotos" can be used to determine exact distances for engineering purposes.

- The lender may decide to have their own appraiser prepare a scale map of the lot or use the tax assessors parcel map and plot the location of the building, and if possible two or more physical features (such as streets or stream) that are also shown on the FIRM. This is only suitable where the distance of the building from the special flood hazard area is obvious in terms of the map scale used on the FIRM.

- A map certified by a licensed land surveyor or registered engineer, that is drawn to scale showing the lot boundary, the exact location and footprint of the building, and two or more features (such as streets) that appear on the FIRM. This is the minimum information needed to scale between the two maps and make a determination. This is the most expensive and most exact option.

If the Flood Insurance Rate Map shows your building located in any of the A or V zones, or if it cannot be clearly demonstrated that it is not in an A or V zone, on that map, you may choose to apply to FEMA for a Letter of Map Revision or Amendment to be officially removed from the special flood hazard area. The application forms are designed to determine if the building is elevated on fill or natural ground that is high enough so the lowest adjacent grade to the building (lowest point where the surface of the earth touches the exposed foundation) is above the projected base flood elevation on the FIRM. If fill has been placed, the forms will also ask for certification that the lowest floor (including basement) is elevated above the base flood elevation. The application forms for a Letter of Map Revision of Amendment can be obtained from your local government floodplain manager or the Federal Emergency Management Agency Regional Office.

If your structure is in fact located in a special flood hazard area, the risk of flooding over a typical 30 year mortgage period is 26 times greater than the risk of fire. The standard property and homeowners insurance does not cover flood damage. Flood insurance does provide financial protection from this identified hazard.

LETTERS TO BORROWERS REQUIRING FLOOD INSURANCE PROBLEMS AND RECOMMENDED SOLUTIONS

Secondary mortgage market agencies have issued policy statements that have caused lenders to review current loan portfolios to determine which are secured by properties located in Special Flood Hazards Areas on the Flood Insurance Rate Maps. The owners of those properties are being required to purchase flood insurance. A variety of letters have been sent out to notify property owners of their obligation to purchase flood insurance and certain statements have appeared in many of the letters that misdirected or confused the recipients. Some of the common problems and suggested solutions are listed below.

1) *Many letters state that "your property may be located in a Special Flood Hazard Area…." This gives the impression that the lender has not done a map determination and places that burden on the customer.*

   The statute and regulations implementing the mandatory purchase of flood insurance placed upon the lender (not the borrower) the responsibility for determining whether the building securing the loan is located in a special flood hazard area. Such determinations must be based on an examination of the current FEMA Flood Insurance Rate Maps or Flood Hazard Boundary maps. Some lenders have developed internal procedures for reading maps and making determinations and others have chosen to hire outside firms to assist them. The lender retains the ultimate responsibility for the accuracy of that map determination.

   The letter should clearly state that the lender has made the map determination and found the property to be in a special flood hazard area. The accuracy of these map determinations should reflect the due diligence and good faith effort standard normally expected of a lender. A high percentage of obvious errors in map determination greatly increases the workload of the borrower, local government, and lender during the appeal process.

2) *Some letters have given the borrower only two weeks to provide evidence of flood insurance or proof that the property is not in a special flood hazard area.*

   The mandatory purchase requirements direct the Instrumentalities (Regulators) to compel lenders to notify the purchaser or lessee of the improved real property or mobile home in writing of the special flood hazard to which the property is exposed. These notifications are to be made "a reasonable period in advance of signing of the purchase agreement, lease, or other documents involved in the transactions". Many property owners are completely unaware of flood maps or flood insurance. They find that dealing with this new subject and resolving the issue, while holding down a full time job, cannot be reasonably done in two weeks. In the force placement of fire insurance, the standard notification time is 45 days.

It is recommended the borrowers be given at least 45 days to deal with this issue before flood insurance is automatically force placed.

3) *In many of the letters lenders have stated that the insurance will be force placed unless proof of existing flood insurance is provided or proof from the Federal Emergency Management Agency (FEMA) that the property is not located in a special flood hazard area is provided.*

   The borrower should not be directed to FEMA as the first step in this process. They should be directed to their local government agency that has a set of Flood Insurance Rate Maps available for public viewing. The borrower can use that map to verify the accuracy of the map determination. If the building is in a special flood hazard area, the lenders decision was correct and if they are incorrect, they will have to provide proof to the lender through a reasonable appeal process. They should only be referred to FEMA if they agree that the map shows them in the special flood hazard area, but they believe the structure is elevated on fill or a natural hill so that the projected flood level would not touch even the lowest exposed portion of the foundation (lowest adjacent grade). In that case, they will be given an application for a Letter of Map Amendment (LOMA) or Revision (LOMR) and have to hire a licensed land registered engineer or licensed land surveyor to certify to the elevations or provide technical data showing that the property is not in the special flood hazard area. If the elevation of the land, on which the building sits, using the lowest adjacent grade, is at or above the base flood elevation on the Flood Insurance Rate Map a LOMA or LOMR will be issued by FEMA removing the building from the special flood hazard area.

   Do not confuse this LOMA or LOMR with a FEMA document titled "Elevation Certificate." The Elevation Certificate is used only to adjust flood insurance premium rates based on the elevation of the lowest floor. It does not remove the building from the special flood hazard area.

4) *Many of the letters do not provide an appeal process back through the lender for property that, upon verification with local maps, is found not to be in a special flood hazard area. This leaves the customer greatly exasperated if they find the map determination made by the lender to be incorrect. Language for a verification and appeal process can be placed in the notification letter or an attachment. A proposed sample of such language is listed below.*

   You may wish to verify the map determination made by our company. This can be done by contacting your local government agency that has a set of the Flood Insurance Rate Maps and asking their assistance in determining the exact location of your building on that map. If your building is in a special flood hazard area (flood zone designations that be in with an A or V), the original map determination is correct and flood insurance will be required. You can also ask your community official if they have obtained a Letter of Map Revision from the Federal Emergency Management Agency (FEMA) that removes your property from the special flood hazard area. The community should such a letter if

there have been channel improvements or other changes that reduce the area covered by the special flood hazard area. If improvements have been made and the community has obtained a letter of map revision from FEMA, you should provide a copy of the letter and any supplemental information needed to show that your property is included in the change.

If your inspection of the Flood Insurance Rate Map with the community official shows that your structure is not in a special flood hazard area and is instead located in flood zone B, C, X, or D; you should take the following steps to demonstrate your flood zone status:

a) Obtain from the community officials a photocopy of the portion of the Flood Insurance Rate Map (FIRM) that shows your property and the flood zone it is located in. Also obtain a photocopy of the title block for the map showing the community name, map panel number and date. Indicate the location of the property and the structure on this map.

b) If the FIRM does not show the street that the structure is on, or shows the street but does not name it; a copy of a detailed located street map, including a copy of the map scale, should be provided. Indicate the location of your property on this map.

c) Obtain an unreduced copy of the Tax Assessors parcel map, including the scale, which shows the lot in question along with the adjacent lots and street. Indicate the location of the property and building on this map.

d) Submit these maps for our review. In most cases this will be enough additional information to allow us to refine the original map determination. In a few cases where part of the land is in a special flood hazard area, a map certified by a surveyor or registered engineer may be required to determine the exact location of the building. If the local officials are willing to provide a written statement that the property is not in a special flood hazard area, that statement would be helpful, bur not necessary to our final determination.

5) Some letters do not emphasize the fact the force placed insurance is usually much more expensive than insurance coverage purchased through an insurance agent in the normal fashion, with the detailed information needed to determine a sound actuarial rate.

Many force place policies are quoted with rates of $1000 or more for a one year policy. The average policy from the National Flood Insurance Program (NFIP) cost $275 for a one year policy. When this is not explained, many people incorrectly assume that all flood insurance costs the same and area not motivated to obtain coverage at the best available rate by seeking a flood insurance policy on their own through a local insurance agent.

All letters should point out the significant difference in rates between force placed and regular flood insurance policies and strongly urge borrowers to obtain a regular policy.

6) The Federal Insurance Administration, the directorate within the Federal Emergency Management Agency that administers the National Flood Insurance Program, has developed a Mortgage Portfolio Protection Program (MPPP). The MPPP is intended for use by mortgage lenders in bringing their mortgage portfolios into compliance with the flood insurance requirements of the Flood Disaster Act of 1973. The notification requirements to the borrower under this program address the problems discussed above including a 45 day notification period, three notification letters, and specific language encouraging the borrower to purchase a properly underwritten flood policy. This notification process should be a standard for the lending industry whether they use the MPPP or an alternative placing flood insurance as part of a portfolio review. Additional information on the MPPP can be obtained from the National or Regional offices of the Federal Emergency Management Agency.

5.3 Increased Cost of Compliance Coverage

On February 25, 1997, a final rule was published by the Federal Insurance Administration (FIA) adding coverage under the Standard Flood Insurance Policy for the increased cost to bring structures into compliance with state or community floodplain management laws or ordinances after flood losses. The mandatory coverage is added to all standard flood insurance policies except for those sold in Emergency Program communities, contents-only policies, dwelling policies on individual condominium units, and group flood insurance. For these cases, Increase Cost of Coverage (ICC) is not available. In a condominium building, ICC coverage is only available through the Condominium Association's flood policy.

The current ICC coverage limit is $20,000 per building or for non-condominium townhouse construction, per unit, per policy. This coverage amount is in addition to the building amount of insurance purchased. However, for any one flood event, the amount of combined loss payment received from building coverage and ICC coverage cannot exceed the maximum program limits of $250,000 for residential structures and $500,000 for nonresidential structures.

Repetitive loss structures would be eligible for ICC payments when two conditions are met:

1. the community has adopted and is enforcing a cumulative, substantial damage provision, or repetitive loss provision in its floodplain management ordinance that requires action by the property owner and

2. the structure has a history of flood claims under the NFIP that satisfies the statutory definition of repetitive loss structure.

A repetitive loss structure is defined as a structure, covered by a contract for flood insurance issued pursuant to the National Flood Insurance Act, that has incurred flood-related damage on two occasions during a 10-year period ending on the date of the event for which a second claim is made, in which the cost of repairing the flood damage, on average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event. In addition to the current claim, the NFIP must have paid the previous qualifying claim, and the state or community must have a cumulative, substantial damage provision or repetitive loss provision in its floodplain management law or ordinance being enforced against the structure.

This coverage will not pay for increased cost of compliance to meet state or community floodplain management laws or ordinances that exceed the minimum criteria of the NFIP.

This coverage will pay for the incremental cost, after demolition or relocation, of elevating or floodproofing a structure during its rebuilding at the same or another site to meet

state or local floodplain management laws or ordinances even if the structure had received a variance from applicable floodplain management requirements prior to the loss.

FEMA is aware that $20,000 will not cover the entire cost to bring most structures into compliance with the NFIP minimum requirements. Other programs, such as the Hazard Mitigation Grant Program or the Flood Mitigation Assistance Program, can be used to supplement the $20,000. It is assumed that the state or communities will work closely with the property owner to determine the most technically feasible and cost effective mitigation measure for the damaged structure. It is also expected that states or communities that have adopted a mitigation plan will ensure that the selection of the mitigation measure will be consistent with the approved plan and coordinated with other mitigation programs and activities.

5.5 Flood Insurance Rates and FIRMs

Local community officials play an important role in the NFIP. The decisions they make have a direct impact on the flood insurance premium rates that owners pay. To reduce these rates, officials must have a basic understanding of how their floodplain management efforts affect flood insurance premium rates. The premiums on new buildings are based on the risk of flooding and flood damage. If a building is built incorrectly, the owner may be faced with very high premiums or insufficient coverage; however, if a building is built properly, the owner will pay less than what it costs to insure a pre-FIRM building under the subsidized rates.

Pre-FIRM buildings are those built before the effective FIRM date. This means that the buildings were constructed before detailed flood hazard data and flood elevations were provided to the community. It also means that the buildings were constructed before the community enacted comprehensive regulations on floodplain construction. Pre-FIRM buildings can be insured using subsidized rates, which are designed to assist people to afford flood insurance on buildings that were not built with flood protection. This subsidized rate is funded through an insurance mechanism called cross-subsidization; not through taxpayers. The pre-FIRM building rates are based on the building elevation and FIRM zone. If a pre-FIRM building is substantially damaged or substantially improved, it will be re-rated as a post-FIRM building. Table 3 displays rates for a pre-FIRM single-family dwelling and the rates are per $100 coverage as of May 1, 2000. The two numbers under the building and contents columns reflect the rates for the basic and additional layers of coverage.

Table 3: Rates for pre-FIRM single-family dwellings

BUILDING TYPE	A, AE, A1-A30, D ZONES		B, C, X ZONES	
	BUILDING	CONTENTS	BUILDING	CONTENTS
No Basement	.68/.20	.79/.36	.41/.12	.64/.21
With Basement	.73/.36	.79/.36	.48/.23	.74/.39
With Enclosure	.73/.36	.79/.36	.48/.17	.74/.31
Mobile Home	.68/.20	.79/.35	.41/.25	.64/.21

The premium rates for new or post-FIRM construction are actuarial, which means that the rates are based on the building's known exposed risks. The post-FIRM rates account for the risk on the elevation of the lowest floor of the building in relation to the BFE. Table 4 displays the rates for post-FIRM single family dwellings in the SFHA as of May 1, 2000. The two numbers under the building and contents columns reflect the rates for the basic and additional layers coverage which are depicted in Table 4.

Table 4: Rates for post-FIRM single family dwellings in the SFHA

ELEVATION OF LOWEST FLOOR ABOVE OR BELOW BFE	AE, A1 – A30 ZONES[1]	
	BUILDING	CONTENTS
+4	.16/.08	.21/.12
+3	.16/.08	.21/.12
+2	.20/.08	.21/.12
+1	.35/.08	.42/.12
0	.61/.08	.89/.12
-1	1.55/.781	2.22/1.01
-2	Submit to rate	

[1]AE, A1-A30 Zone rates are for one floor, no basement.

The insurance agent's rate tables do not include cases where the building is two or more feet below the BFE. In these instances, the agent must send the application to their company headquarters for individual ratings, known as a "submit to rate."

A post-FIRM building located in an A Zone cannot be rated using the above tables. It is subject to a rate of $1.80/1.10 for building coverage and contents coverage. This rate can be a disincentive for people to buy flood insurance on post-FIRM buildings within this area. An elevation certificate is necessary to obtain lower rates.

5.6 Frequently Asked Questions Pertaining To Flood Insurance

Who can purchase flood insurance?

Any person (lessee or property owner) can purchase flood insurance provided the community where the property is located is participating in the NFIP. This is true regardless of whether the property to be insured is in an identified/mapped floodplain. In Arizona, all communities with floodprone areas are required by statute to participate in the NFIP.

What types of property can be insured against flood loss?

A building and its contents may be insured. Almost every type of walled and roofed building that is principally above ground can be insured. In most cases, this includes mobile homes but not travel trailers or converted buses. Gas and liquid storage tanks, wharves, piers, bulkheads, crops, shrubbery, land, livestock, roads, machinery or equipment in the open, and motor vehicles are among the types of property which are <u>not</u> insurable.

How is a flood insurance policy purchased?

Any insurance agent or broker licensed to sell property insurance in Arizona can write a flood insurance policy through the NFIP or through an insurance company participating in the "Write-Your-Own" program. An agent or broker can secure application forms from the NFIP and send the completed forms and premium payment to the NFIP. The policy is processed and adjusted for claims payment (if necessary) by an independent servicing company.

There is an optional arrangement between private sector insurance companies and the NFIP called "Write-Your-Own" which allows commercial firms to write flood insurance under their own names. Policies are applied for, processed and adjusted for loss through those firms participating in the program. The FIA hopes this arrangement will substantially increase the number of flood insurance policies.

The "Write-Your-Own" program is subsidized by the NFIP so if a company pays out more in claims than they take in premiums and investment income, the NFIP will reimburse the difference. Any profit under the terms of this arrangement will be returned to the U.S. Treasury.

When should flood insurance be purchased?

The decision to buy flood insurance is often a personal decision. It is safe to say that the cost of the insurance should be offset by the potential benefits derived. Individuals should fully understand the type of coverage that is being provided, the cost, and under what specific circumstances the flood insurance policy will reimburse for loss. Individuals should be encouraged to discuss these matters with a qualified, licensed insurance agent or contact the NFIP by using the toll-free number of 1-800-638-6620.

What is a loss in progress?

It is important to realize that a flood insurance policy will not pay for damages where there is a loss in progress prior to the inception of the policy. A "loss in progress" is a situation in which actual flood damages have occurred to the insured items prior to the inception date of the flood insurance policy. A flood insurance policy becomes effective following a five (5) day waiting period from the date the policy application forms and premium are sent to the NFIP.

What constitutes a flood?

While in most instances there is little doubt that a flood has occurred, there are increasingly more cases where this determination is not clear-cut. The definition of flood is then critical in determining under what conditions a claim for damages would be paid. The NFIP defines "flood" as the following:

1. "A general and temporary condition of partial or complete inundation of normally dry land areas from…

    a) The overflow of inland or tidal waters;

    b) The unusual and rapid accumulation or runoff of surface waters from any source; and

    c) Mudslides (i.e., mudflows) which are proximately caused by flood, as defined above and are akin to a river of liquid and flowing mud

on the surface of normally dry land area, as when earth is carried by a current of water and deposited along the path of the current.

2. The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion, or undermining caused by waves, or currents of water exceeding the cyclical levels which result in flood, as defined above.

3. Sewer (drain) back up, which is covered only if it is caused by flood, as defined above."

5.7 The Community Rating System

With the implementation of the Community Rating System (CRS) in 1990, communities have been encouraged to exceed the minimum requirements of the NFIP to protect floodplain development. Communities are rated on floodplain management activities, and the rating system is similar to the rating for fire insurance. Each community is considered a Class 10 if it is just complying with the basic regulations. For each 500 points the community earns for more stringent measures, it is reduced a class and its policyholders receive a 5 percent reduction in flood insurance premiums for each class. For example, if a community attains a Class 7 CRS rating, a 15 percent premium reduction is allowed to all flood insurance policyholders. A notice is mailed with each flood insurance policy stating that the premium credit is due to the floodplain administration measures taken by the community.

To be covered by a flood insurance policy, a property must be in a community that participates in the NFIP. To qualify for the program, a community adopts and enforces a floodplain management ordinance to regulate development in flood hazard areas. The basic objective of the ordinance is to ensure that such development will not aggravate existing flooding conditions and that new buildings will be protected from flood damage. There are more than 18,000 communities participating in the NFIP. Prior to 1990, flood insurance rates were the same in all participating communities, even though some communities' tasks expand beyond regulating construction of new buildings and adhering to the national standards.

The objective of the CRS is to reward these communities that do more than just regulate construction to minimum national standards. The goals of the CRS are threefold:

"[To] encourage, by the use of flood insurance premium adjustments, community and state activities beyond those required by the NFIP to:
Reduce flood losses,
Facilitate accurate insurance rating, and
Promote the awareness of flood insurance."

To recognize community floodplain management activities in the insurance rating system, they must be described, measured, and evaluated. The basic tool for this is the CRS Schedule,

which lays out the application procedures, creditable activities, and the credit points these activities are worth. A community receives a CRS classification based upon the total score for its activities. The Commentary explains the Schedule and provides examples. The Schedule and Commentary are included within the CRS Coordinator's Manual, the primary document that details the program.

No fee is charged for a community to apply for participation in the CRS. Costs to the community are the costs of implementing creditable floodplain management activities and the costs of staff time in preparing the CRS application.

The CRS Coordinator's Manual describes the 18 floodplain management activities, contains the documentation required for credit of each activity, and includes the formulas used to calculate the credits. Arizona's communities are automatically eligible for credit for one foot of freeboard as required by the Arizona Revised Statutes (A.R.S.). The ADWR Dam Safety Program also qualifies all communities for 72 points. This is an automatic credit unless the community has an unsafe dam within its jurisdictional boundaries for which they are responsible.

An application for a CRS classification may be submitted at any time. A community applies by sending a completed *CRS Application* with appropriate documentation to its ISO/CRS Specialist. In order to apply for any CRS credit, the community must maintain FEMA's Elevation Certificates for all new and substantially improved construction after the date of application for CRS classification. All CRS Communities must begin using the new FEMA Elevation Certificate (edition 8-99) no later than October 1, 2000. A community's application must also include a letter from FEMA Regional Office stating that the community is in full compliance with the NFIP.

The qualifying community's total points, CRS classes, and flood insurance premium credits are shown below in Table 5. A local government is automatically in Class 10 unless it submits an application for CRS classification that indicates minimum federal standards are exceeded.

Table 5: Flood Insurance Rate Reduction Classes

RATE CLASS	RATE REDUCTION	CREDIT POINTS REQUIRED
1	45%	4,500 +
2	40%	4,000 - 4,499
3	35%	3,500 - 3,999
4	30%	3,000 - 3,499
5	25%	2,500 - 2,999
6	20%	2,000 - 2,499
7	15%	1,500 - 1,999
8	10%	1,000 - 1,499

RATE CLASS	RATE REDUCTION	CREDIT POINTS REQUIRED
9	5%	500 - 999
10	0%	0 - 499

CRS activities and regulations that are enacted and enforced should provide a greater degree of flood protection and minimize the effects of a flooding event on people, property, and the local community. Table 6 provides the maximum points a community earns when carrying out the activity series listed under the CRS Field Procedural Outline.

Table 6: CRS Activity Points

SERIES	ACTIVITY	MAXIMUM POINTS
300	Public Information	749
400	Mapping & Regulatory	4,776
500	Flood Damage Reduction	6,565
600	Flood Preparedness	1,220

FEMA has contracted with Insurance Services Office, Inc. to verify all applications for CRS credit. The ISO representative for Arizona can offer assistance in reviewing community activities, and he can be contacted:

Ron Mielnicki
Insurance Services Office
P.O. Box 2819
2375 West Willow Breeze
Chino Valley, Arizona 86323-2819
(520) 636-5969, email: rmielnicki@iso.com

Arizona's ISO representative uses the following outline for these verification visits.

CRS FIELD PROCEDURAL OUTLINE

Activity 310, Elevation Certificates:

Maintain a list of all permits for new construction in the SFHA since the community's CRS application date. Five (5) elevation certificates will be selected from this list to be checked for accuracy. If less than 5 permits were issued, all elevation certificates will be checked. If errors are found in the first 5, an additional 10 will be checked.

All post-FIRM and pre-FIRM elevation certificates will be checked the same way. If an earlier FEMA form was used, all items must be accurate. If any other (non-FEMA or HUD) form was used, there is no credit unless the FEMA regional office in writing for CRS purposes approved the form.

Activity 320, Map Determinations:

Respond to inquiries about what FIRM zone a property is in and publicize this service. The publicity that advises insurance agents must also tell them about the availability of elevation certificates.

If mailing list was not submitted during the application process, then a copy of a typical page will be collected during verification.

You will be asked to do a map determination and a copy of a typical page from your log will be collected.

You will need documentation showing how you keep FIRM's updated. The community must have copies of old FIRM's that have been in effect since 1999 or the date the community applied to the CRS, whichever is later.

Activity 330, Outreach Projects:

Information in the form of notices, articles, flyers, and other materials used in the outreach projects.

Activity 340, Hazard Disclosure:

The community is responsible for collecting this information. Review the documentation that demonstrates that real estate agents are advising potential property purchasers of the flood hazard. Creditable documentation for this activity could be copies of notations on summary sheets, offer to purchase forms, MLS forms, or other media which are provided to the potential purchaser.

Activity 350, Flood Protection Library:

The library maintains references on flood insurance, flood protection, and flood related material. It will be visited to review documents.

Activity 360, Flood Protection Assistance:

Give inquiring property owners technical advice on how to protect their buildings from flooding and publicize the service.

Activity 410, Additional Flood Data:

Credit based on the FIRM zone and the type of study that produces the regulatory flood elevation. Credit given if base flood elevations are provided in an unnumbered A zones, and/or are provided in a B, C, D, or X zone, and/or new base flood elevations are provided in an AE or A numbered zone and the new elevations are higher than the ones shown on the FIRM.

The community must provide all documentation required demonstrating that the element applies to all appropriate areas with its application. If the community uses option 1 (1.0) for this activity, an impact adjustment map is necessary. If option 2 (default) is used, an impact adjustment map is not needed. If option 3 (%) is used, an impact adjustment map is usually required.

If additional documentation is provided during the verification visit, then this documentation will be verified in field following office verification procedures.

Activity 420, Open Space:

Guarantee current vacant floodplain lands will be kept free from development and fill; additional credit is given for areas still in, or restored to, their natural state, and for deed restricted open space.

Five (5) open space parcels will be selected for field verification. Documentation showing the development restrictions on these parcels will be checked. Areas such as city parks, which are obviously open space, do not require rigorous documentation.

If credit is requested for deed restrictions, five (5) parcels with deed restrictions on them will be selected for verification. Documentation showing the deed restrictions on these parcels will be required.

A trip into the field will be required to verify that the parcels are being maintained as open space and the deed restrictions are being adhered to. If the community has aerial photos taken within the last two years prior to the verification visit, these photos may be used in lieu of field verification for open space preservation.

If the community has requested credit for open space in special hazard areas, some of these spaces will be included in the sampling.

Activity 430, Higher Regulatory Standards:

If freeboard (FRB) credit was applied for, a sampling of five (5) structures built since the application date to CRS will be checked to see that all permits conform with the freeboard requirement. All Arizona communities should apply for this element.

If foundation (FDN) credit is applied for, a sampling of five (5) structures built since the application date to CRS will be checked to see that all permits conform with the foundation requirement.

If cumulative substantial improvement (CSI) credit was applied for, the method for tracking the improvements needs to be produced.

If lower substantial improvement (LSI) credit is applied for, the method for the community's procedures for determining the value of the structure and proposed improvements used to determine the threshold for substantial improvements needs to be produced.

If protection of critical facilities (PCF) is applied for, a permit file of a recent critical facility will be asked for to verify credit.

If protection of floodplain storage capacity (PCS) is applied for, a sample of five (5) project permits built since the application date for CRS will be checked.

If natural and beneficial functions regulations (NBR) is applied for, the regulatory language will be reviewed.

If state mandated regulatory standards (SMS) is applied for, the state regulatory language will be reviewed and will be verified that it is being applied in your community. All Arizona communities should apply for this element.

If a community has been recognized under the Building Code Effectiveness Grading Schedule (BCEGS), credit will be applied under building code and staffing (BCS). This requires no verification from the community.

Activity 430LZ, Low Density Zoning:

The credit for open space (OS) and low density zoning (LZ) are mutually exclusive. If there is any open space area within the low density zoning area, the low density zoning area must be reduced by the amount of open space.

As with open space, five areas will be selected for field verification. A drive through these areas will be necessary to confirm that the areas conform to low density credit.

Activity 440, Flood Data Maintenance:

For Additional Map Data (AMD) credit, we will select a sample of five parcels within the area for which credit is requested. These samples can include a GIS system, computerized parcel records, or an overlay map or a combination of all three (3). These five parcels will be checked for the items, which were applied for.

For Elevation Reference Mark (ERM) credit, we will need to see the procedures for maintaining the elevation reference marks.

Activity 450, Stormwater Management Activities:

Regulate new development throughout the watershed to ensure that post-development runoff is no worse than pre-development runoff and/or protects or improves water quality.

An outside contractor reviews the Stormwater Management and Stormwater Master Plan (SMP) and no field verification is required unless credit is requested for public maintenance of required facilities (PUB). In this case, several detention/retention basins will be field visited.

If credit is applied for in the B, C, D, and X zones (FRX), we will select a sample of five building permits issued outside the SFHA and check for accuracy.

If credit is applied for in erosion and sediment control (ESC) and/or water quality (WQ), sampling will include verification of a recent project or projects.

Activity 510, Repetitive Loss Projects:

Prepare, adopt, and implement a comprehensive plan that addresses the community's flood problem, and evaluate and revise the plan. Repetitive loss applicants fall in one of three categories:

1. Category A: No repetitive losses, no action required.

2. Category B: A community with at least one but less than ten repetitive loss properties. This community must map its repetitive loss areas, correct their NFIP Repetitive Loss Correction Worksheets (AW-501), determine the causes of the flooding and conduct an outreach project.

3. Category C: A community with ten or more repetitive losses. This community, in order to participate in the CRS, must adopt a Floodplain Management Plan that at least, addresses their repetitive loss areas. In addition, all conditions of category B must be satisfied. Note: all Category C communities who are submitting a new CRS Application in order to join the CRS program must adopt a floodplain management plan for its repetitive loss areas. The plan must be submitted with the community's CRS Application. Other communities have until October 1 of the following year to prepare and adopt the required floodplain management plan for its repetitive loss areas.

Prior to the verification visit, comments from the repetitive loss reviewer will be checked and discussed with the community during the visit.

Activity 520, Acquisition and Relocation:

Documentation will be checked to verify that the buildings were removed or relocated outside the SFHA since the community's first firm date.

A field visit will be conducted to verify that all the building were removed and not replaced.

Activity 530, Retrofitting:

Protect floodprone buildings through elevation, on-site barriers, or floodproofing. The sampling process includes checking 5 sites in the field. If sampling indicates problems, 5 or 10 more sites will be checked.

Activity 540, Drainage System Maintenance:

Conduct at least annual inspections of the area's drainage system that would include natural drainage ways or channels, human made storm sewers or ditches, and detention/retention basins and remove debris as needed.

From a map or other documentation of the drainage system, we will select five inspection points. These inspection points may be anywhere in the drainage system not just in the SFHA or ARF. If the first five inspection points appear to comply with the maintenance program documentation, no other field work is required.

Activity 610, Flood Warning Program:

Provide early flood warnings to the public and have a detailed flood response plan keyed to flood crest predictions.

The ISO/CRS technical reviewer does all verification for this activity. No other verification is required.

Activity 620, Levee Safety:

> Maintain levees that are not reflected on the FIRM as providing base flood protection. The ISO/CRS technical reviewer does all verification for this activity. No other verification is required.

Activity 630, Dam Safety:

> Any community in an approved state that is in compliance with the state program will automatically receive the appropriate credit points for its state's dam safety program even if it did not submit AW-630.
>
> No other verification is required.

5.8 Flood Mitigation Assistance Program

The Flood Mitigation Assistance Program is designed to provide funding assistance to communities during non-disaster conditions. Instead of waiting for the next flood to damage known at-risk structures in the community, planning and retrofitting, or relocation can also be accomplished during non-disaster times as long as it is part of the community's long-range mitigation plan, and it has been included in the state's Hazard Mitigation Plan and approved by FEMA. Communities will be required to have a mitigation plan in effect, or be in the process of preparing one, prior to receiving disaster assistance funds. The Mitigation Plan must include a section on repetitive loss.

Flood Mitigation Assistance (FMA) was established under the National Flood Insurance Reform Act of 1994 (NFIRA) in which Congress authorized the establishment of a federal grant program to provide financial assistance to states and communities for flood mitigation planning and activities. FMA is a state-administered, cost-share program through which states and communities can receive grants for flood mitigation planning, technical assistance and mitigation projects. The goals of the program are as follows:

- To reduce the number of repetitively or substantially damaged structures and the associated claims on the National Flood Insurance Fund.
- To encourage long-term, comprehensive mitigation planning.
- To respond to the needs of communities participating in the NFIP to expand their mitigation activities beyond floodplain development review and permitting.

- To complement other federal and state mitigation programs with similar, long-term mitigation goals.

There are three types of FMA grants:

1. *Planning Grants* to assist states and communities in developing Flood Mitigation Plans. Under Section 1366 (of NFIRA), a FEMA-approved Flood Mitigation Plan is required in order for a state or community to receive an FMA project grant.

2. *Project Grants* to fund eligible flood mitigation projects. FEMA encourages states to prioritize the mitigation activities outlined in their Flood Mitigation Plans and fund projects that will greatly reduce or eliminate the risk of flood damage to buildings, manufactured homes, and other NFIP-insurable structures. Mitigation of repetitively or substantially damaged structures is a high priority. Eligible activities include elevation of structures, acquisition of insured structures and real property, relocation, or demolition of insured structures and dry floodproofing of insured structures.

3. *Technical Assistance Grants* to assist states in providing technical assistance to applicants in applying for the program or in implementing approved projects.

FMA's success in reducing future flood insurance claims depends on the ability of states and communities to develop and maintain long-term Flood Mitigation Plans. States will award FMA grants to fund cost-effective projects that reduce flood damage with priority given to repetitively or substantially damaged structures. FMA's strategy is intended to keep future flood insurance premiums down by reducing claims against the National Flood Insurance Fund. More information on these topics can be obtained from the NFIP State Coordinating Agency.

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